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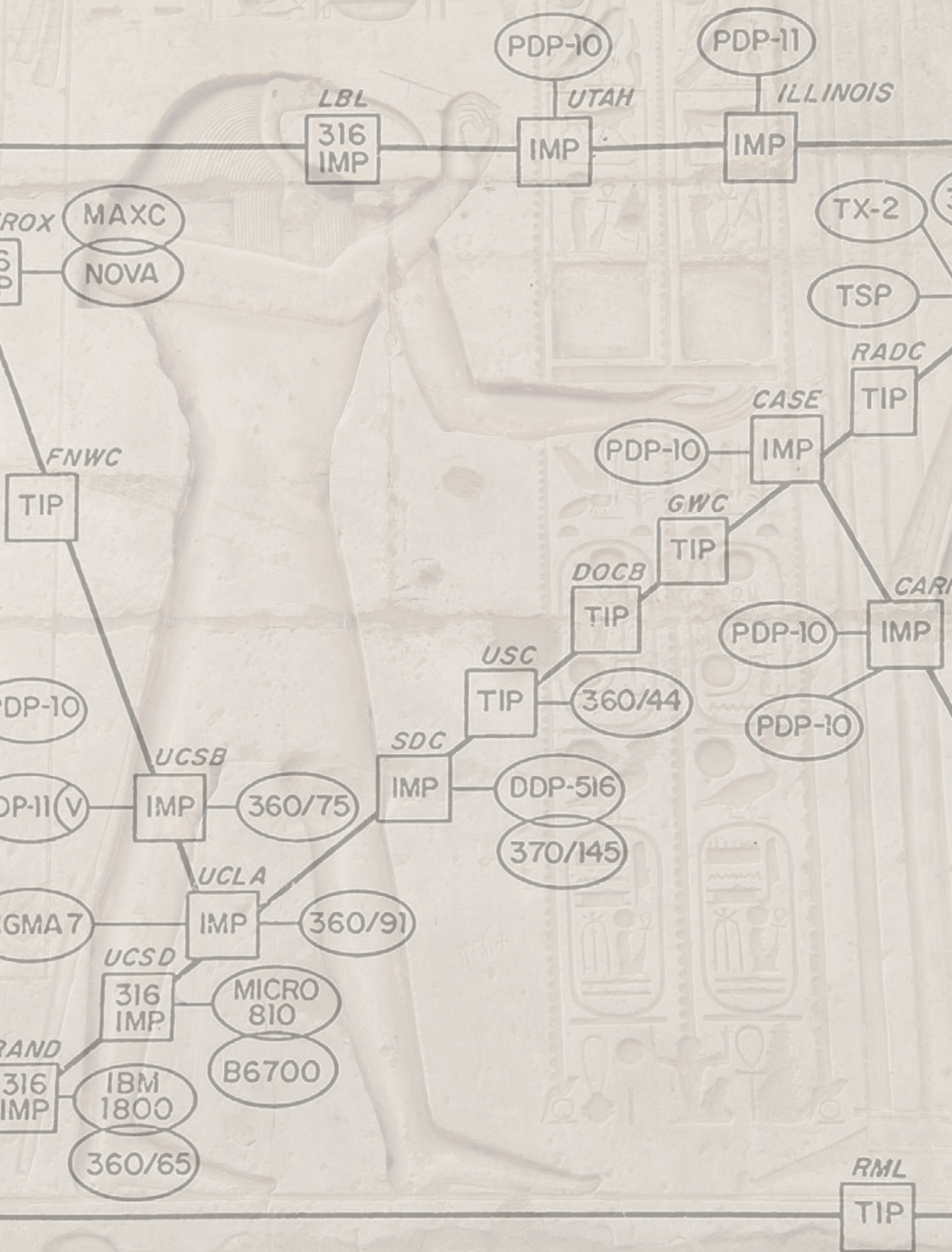
**A HISTORY OF  
THE MEDIA**

~  
**JOHAN JARLBRINK  
PATRIK LUNDELL  
PELLE SNICKARS**



# FROM BIG BANG TO BIG DATA

# PA NETWORK, LOGICAL MAP, MAY 1968



*From* **BIG  
BANG**

*to* **BIG** **A History of  
the Media**  
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Johan Jarlbrink  
Patrik Lundell  
Pelle Snickars

**DATA**

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# CONTENTS

Key Thinkers in the History of Media vii

Acknowledgments ix

Introduction 3

In the Beginning Was ... ii

Geomedia 13

Biomedia 19

The Talking Human 22

Doing Things with Words 26

Visual Communication: Images, Sculptures, and Counting Systems 32

From Bookkeeping to Writing 37

Enduring Media: Stone, Clay, Rituals 40

Connecting Empires 43

Writing and Reading Practices: The Examples of Greece and Rome 48

Silk Roads 53

Arabic Convergence Culture 56

European Information Overload 61

Medieval Intermedia 66

The Inca Empire Solves a Knotty Problem 71

Early Modern Oral, Written, and Visual Continuity 73

Multimedia Festivals and Everyday Life 79

A Partially New Printing Technology 83

A Printing Revolution? 90

The Media of the Scientific Revolution 98

Print Capitalism	100
Politics and the Public Sphere	104
Memory, Rights, and Literacy	107
The Modern Experience – Media in the Nineteenth Century	III
Speech in the Public Sphere	120
The Medium Par Excellence?	125
The Modern Press	129
Electric Media	140
A New Visual Culture	150
Audiovisual Media – About the Past	155
The Media of the Masses	157
Mass Media as an Industry	167
Mass Media as Politics in the Twentieth Century	182
Mass Media Hardware: The Example of Japan	198
Everyday Media	206
Remediation and Mobility	215
Analog and Digital	217
Calculating Machines as Media (or Vice Versa)	222
Memex, Infrastructures, and Networks	231
Breakthrough of the PC	237
World Wide Web	244
The Social Significance of Computerization	249
Mobile Devices – Social and Streaming Media	253
Digital Media Specificity and Big Data	259
Afterword	269
References	275
Index	293

# KEY THINKERS IN THE HISTORY OF MEDIA

- The Messenger (Sybille Krämer) 15
- Dialogue versus Mass Communication (John Durham Peters) 18
- Recorded Spoken-Word Poetry (Milman Parry) 30
- Oral and Written Culture (Walter J. Ong) 31
- Imperial Communications (Harold Innis) 45
- On Files (Cornelia Vismann) 52
- The Printing Press as an Agent of Change (Elizabeth Eisenstein) 85
- A Bourgeois Public Sphere (Jürgen Habermas) 105
- Always an Information Age (Robert Darnton) 110
- Old New Media (Carolyn Marvin) 141
- Art and Media (Walter Benjamin) 154
- Media Archaeology (Wolfgang Ernst) 164
- The Medium Is the Message (Marshall McLuhan) 180
- Television, Technology, and Society (Raymond Williams) 197
- Corporality, Cybernetics, and Posthumanism (N. Katherine Hayles) 205
- The Network Age (Manuel Castells) 246
- Convergence Culture (Henry Jenkins) 260

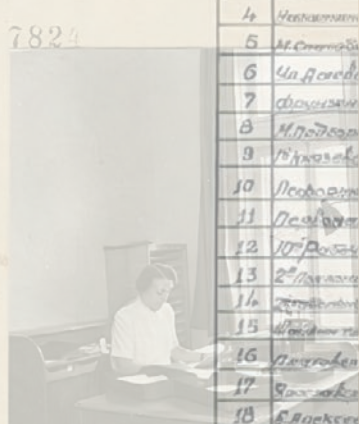
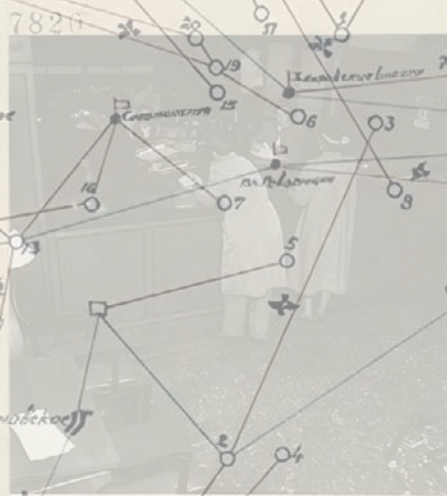
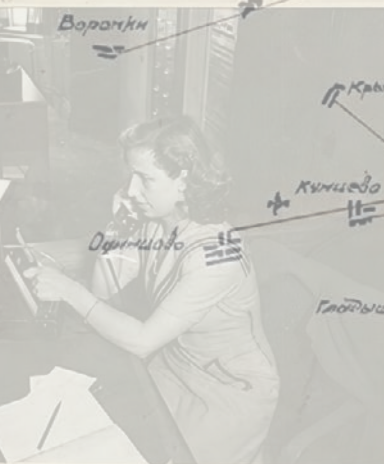
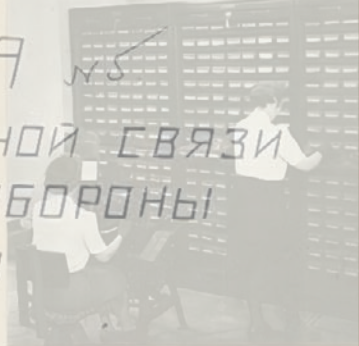
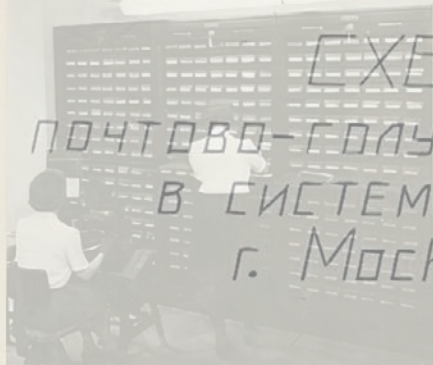




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# СХЕМА №5 ПОЧТОВО-ГЛУБИНОЙ СВЯЗИ В СИСТЕМЕ ОБОРОНЫ г. Москвы



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2	Кунцево	
3	Васильков	
4	Чертанов	
5	М. Савинск	
6	Ул. Давыд	
7	Фрунзе	
8	М. Подп	
9	Николо	
10	Покровск	
11	Павлов	
12	107-й	
13	2-й Павлов	
14	Савинск	
15	М. Подп	
16	Покровск	
17	Савинск	
18	Савинск	

# FROM BIG BANG TO BIG DATA





# INTRODUCTION

In one of his essays, the Serbian author Momo Kapor writes about a middle-aged man with his own stall at Kalenić market in the middle of Belgrade. Although he sold no fruit, vegetables, or meat, ladies out shopping flocked to see him. Why? Because he made a living recounting the plot of the popular Latin American soap operas, *telenovelas*, that were broadcast on Serbian TV. If you missed an episode, it could be hard to follow the storyline, so off you went to the man in the market. “And then Esmeralda seduced Ricardo, by appearing before him in her underwear,” he related to the gathered audience. “While everyone believed Alonso to be the murderer, it was, in fact, his twin brother Alvaro all along, who was separated from his brother when he was just one year old. The whole intrigue was devised not by Consuella, as everyone thought, but by her mother-in-law Dolores.” The satisfied customers paid a small amount for the oral summary of the TV episode.

Kapor doesn't date this event, but a reasonable guess places it around the year 2000 or a little later. Telenovelas had been broadcast before, but the main wave swept across the Balkans in the late 1990s. For over a decade, a number of series ran on the region's TV channels, often at the same time. Millions of people who, just a few years earlier, had been at war with each other were now captivated by the same programs from Argentina, Mexico, and Brazil. Local channels had no money to produce their own series, and the Latin American soaps were much cheaper to buy than the US alternatives. Few people at the time had a video or DVD player to record the programs. And because streaming was a long way off, people were forced to follow the drama “live” – or visit the man in the market. In the 2010s, the Latin American series were replaced by Turkish imports.

What Kapor describes can thus only have happened there and then. However, the story bears witness to a constantly recurring theme. Media and media use from the past live on longer than we might think, while it takes time for new media to establish themselves. The new rarely replaces the old. It is more common for the old and the new to interact, complement, or influence each other. Following cultural theorist Raymond Williams, practically all media cultures of the past encompass dominant, emergent, and residual elements.

After a twentieth century dominated by a range of large-scale mass media, digital media are today challenging structures that long seemed unassailable. Old media categories can no longer be taken for granted as newspapers, radio, television, film, and music are produced, distributed, and consumed via platforms that erase the boundaries between what was once separate. The differences between two-way communication and mass communication were obvious when a telephone was something you made calls on and moving images were largely produced by major media companies. Today, platforms such as YouTube and Instagram serve as media channels for social interaction and mass communication at the same time. A few broadcasts in most countries still attract a mass audience, but the audience is more often part of narrow segments that coalesce around shared areas of interest. New media do not operate in the way that we were once used to – at least for those of us who are old enough to remember the age of mass media in the twentieth century.

The contemporary digital disruption has captured the interest of many media historians. Rapid changes in the present, or at least the assumption of them, have prompted reflections on redefined media landscapes in the past. Yet if media history teaches us anything, it is that today's new media will also undergo changes; the internet will not be around forever in its current form. All media have been new at some point – invented, launched, changed, and sometimes forgotten. In this book, we embrace such historical perspectives. Looking back, at every era and at every period in the past, there exists a myriad of different media. We make no assumptions about the trend moving from small to large scale, from the primitive to the fully realized, from a medium's infancy to its "golden age." Nor is our work defined by the experience of twentieth-century mass media since digitization has rendered such a conventional take on media history impossible.

In fact, seen from a longer perspective, the mass media-driven twentieth century is a historical oddity. To the extent that one can talk about a normal period in media history, it is more likely to be defined by segmented audiences and by mass communication and two-way communication interacting and flowing into each other, more or less like today – or in the market in Belgrade. One result of digitization altering the notion of the media is that the diversity of historical media has been rediscovered after being overshadowed for a long time by the monolithic mass media.

Historian Robert Darnton has observed that every historical society has been an information society in one way or another. And since no

information exists without a material carrier (sound waves, clay, paper, cables), we could just as well say that every society has been a media society – in its own way. All societies throughout history have been administered and represented, their cultures preserved and spread, with the help of media that have stored and transferred different types of information. Then again, societies and media have also constantly evolved in various directions and dimensions. The media society of Babylonia had very little in common with eighteenth-century France, which differed significantly from that of twenty-first-century Serbia. Only by applying a historical perspective to the media and societies of the past can we say something about how they have mutually shaped and changed each other – including in our modern age.

### *What Is a Medium?*

A common way of presenting media history is to focus on distinct media cultures that follow each other chronologically. Such an explanatory model usually stipulates that an original oral culture was replaced by a written one (in ancient Greece), which in turn was followed by a print culture (around 1450), an electronic or audiovisual culture (from the mid- or late nineteenth century), and a modern digital culture (that began at the end of the twentieth century). What one might call the cultural model has the advantage of highlighting the specifics of different media forms, clarifying how they are distinct from each other and how they simultaneously restrict and facilitate what can be communicated. The disadvantage is that the model is insensitive to historical nuance and tends to present the different periods as being more coherent than they actually were. In what are usually termed written cultures, most communication was in fact oral. And writing by hand didn't stop just because printing was an option. Printed material has never been consumed in such large amounts as during the age of electronic and audiovisual media. In the course of the televisual breakthrough of the 1950s, people listened to the radio more avidly than ever. And as we have seen, oral storytelling flourished in Belgrade as recently as a mere two decades ago.

While taking account of histories that emphasize the discrete features of different media cultures, in this book we have chosen to highlight the diversity of historical overlaps and the interplay between different media. No culture has been homogeneous in terms of its media. We have also tried not to take media specifics for granted. It has, for example, traditionally been argued that the defining charac-



teristic of print was the mass production of identical copies, which among other things enabled knowledge to be disseminated to a broader audience. This may describe an ideal scenario. But when we look more closely at the scientists of the sixteenth and seventeenth centuries who pinned their hopes on the printing press, it is apparent that in practice they had great difficulty in obtaining exact copies. A depiction of mountains on the moon in one edition of Galileo Galilei's groundbreaking *Sidereus nuncius* (first printed in 1610) became what looked like valleys in other editions. Media technologies must thus be placed in their historical context before we can draw any conclusions about their cultural meaning.

Besides the oral, written, printed, electronic, and digital media that the cultural model identifies, one might also discern other media forms and formats: visual media before printing, for instance; perhaps even media that go beyond the human, such as geological and biological media. The question of how to define a medium remains far from clear-cut. A classic definition describes media in terms of various modalities, usually text, images, sound (and later moving images). This captures much of what we tend to think of as media – but far from everything. Numbers, for example, don't really have the same properties as text. And sculptures and other three-dimensional material objects are not images, even though they are visual.

Defining media in terms of modalities can thus narrow the field of vision. Media historian Lisa Gitelman suggests focusing on the technological forms of media. Texts are always written or printed – or in some other way stored or mediated via material carriers. Of course, the same also applies to images, sound, and numbers. And these carriers and mediation channels have an impact on how modalities communicate. A data file and a runestone can both contain text – but the material properties of the carriers mean that they have different affordances and limitations. Certain carriers have the capacity to convey only a specific modality; others – such as sound film – allow combinations. Some of them are mobile and possible to reproduce; others are practically immovable and difficult to copy. While some are short-lived, there are others that preserve the modalities for millennia. And so on. The history of the media is, not least, the history of how different materials and technologies have been developed to store and transfer, reproduce, and spread content.

Alongside the technical components of the media, Gitelman points out the importance of what she calls social protocols in understanding media's place in history. By social protocols, she means the way

the media are used, the everyday routines of which they become part, and the political and economic systems that frame and govern them. When Germany launched television during the Berlin Olympics in 1936, people went to watch the broadcasts together in public spaces set up for that purpose, just like the cinema. Later, television became something for the home, with a specific TV room, a TV sofa, TV tray tables, and even TV dinners. You watched with your family. In the 1980s it became more common to have a television set in the bedroom and the kitchen, leading to more individualized viewing. Although the technology developed, the TV sets essentially remained the same for the whole period – what changed were the protocols, the ways that television was used.

Modalities, technical forms, and social protocols thus form a framework that does justice to the diversity of media while also making their history manageable in practical terms. However, in this book we will occasionally consider an even broader spectrum of media. Media are things that *mediate*, that connect sender and recipient, separated in time and/or space. The Greek historical writer Herodotus recounts an illuminating incident in his *Histories*. During the war between the Persians and the Scythians, the latter dispatched a herald with a gift for the Persian King Darius, comprising a bird, a mouse, a frog, and five arrows. The king and his advisers understood at once that the gift carried a message – the question was what. Darius’s own interpretation was that the Scythians were surrendering and giving themselves and their lands over to the Persians: “for he reasoned that a mouse is a creature found in the earth and eating the same produce as men, and a frog is a creature of the water, and a bird most like to a horse; and the arrows (said he) signified that the Scythians surrendered their weapon of battle.” One of his advisers felt this was a little convoluted. “He reasoned that the meaning of the gifts was, ‘Unless you become birds, Persians, and fly up into the sky, or mice and hide you in the earth, or frogs and leap into the lakes, you will be shot by these arrows and never return home.’”

The bird, the mouse, the frog, and the arrows clearly served as media. They had a sender and a recipient and carried a message, if a somewhat obtuse one. History is full of similar mediated communication. In our view, a history that omits media of this kind creates a false picture of the media environment of humankind. This is not to say that we should consider every frog and mouse. Nevertheless, alongside the more traditional modalities, there are grounds to highlight at least some of the other media forms that have always existed. Media

historian John Durham Peters has suggested a pragmatic approach to the problem: “Because media are in the middle, their definition is a matter of position, such that the status of something as a medium can fade once its position shifts.” Taking this stance, most frogs are irrelevant as media – but one or two stand out as being of great interest. In other words, all media must be defined both historically and empirically.

Such a broad and inclusive definition of media might come across as a novelty. During more than half a century, “media” has primarily been synonymous with newspapers, radio, television, film, and, more recently, so-called social media. This is mainly what the academic discipline of media studies has dealt with, and this is what most people today mean when they talk about “(the) media.” In a historical perspective, however, it is this narrow understanding of media that is a novelty, not the inclusive definition. After all, the term medium – “between,” in Latin – has a long history. If we search for “medium” in the databases of digitized newspapers, it is easy to see that the concept used to be more open-ended.

The *Gazette of the United-States* explained in 1790 that every “citizen in the United States is interested in the rise of the public papers.” Modern readers might assume that “public papers” referred to newspapers, but this was not the case. What the article described was the function of paper money as a “circulating medium.” Issues related to paper money as a circulating medium were frequently discussed during the nineteenth century. Yet, a newspaper was indeed also understood as a medium. Correspondents writing to the editors regularly asked for permission to address the public “through the medium of your paper.” Editors printing a letter could sometimes explain that it was received “through the medium of the post office.” A medium understood as a general connecting intermediary is also evident from the frequent use of the concept to describe canals, language, diplomats, translators, and those in contact with the spiritual world.

In the twentieth century, however, this inclusive notion of a connecting function was pushed in the background in favour of new technologies for mass communication – the latter a term that had come to be associated with technical transmission. “Media” became the general plural form, referring first and foremost to a limited number of public outlets for news and entertainment as well as the organizations behind them. Raymond Williams sketched the development in his *Keywords* (1976): “*Media* became widely used when broadcasting as well as the press had become important in communications (q.v.);

it was then the necessary general word, mass (q.v.) *media*, *media people*, *media agencies*, *media studies* followed.” It is this narrow understanding of the concept that explains the need for *social* to be added when some forms of digital media are defined as social media. Written letters and phone calls have in an obvious sense always been social. Indeed, the connectivity aspect of all media makes them social by definition. But a plethora of technologies were usually left out when it was mass media that dominated discussions and academic studies. In the nineteenth century there was no need to emphasize the social character of the interaction – it was implicit. “President Jefferson, desiring to establish a more agreeable state of affairs, inquired through a diplomatic medium whether Mr. and Mrs. Merry would honour him to a family dinner.”

### *Structure of the Book*

This book presents a very long history of the media. The structure to some extent follows the division into different media cultures as set out above, but instead of placing the emphasis on historical breakthroughs and revolutions, we have sought to train the spotlight on overlaps and repetitions, historical inertia, and the interplay between new media and old. We believe this gives a more realistic picture of the way media are established, used, and transformed – not least in the twenty-first century. It is against the backdrop of our own modern media that past media cultures become interesting and gain meaning. The media history presented thus examines both extinct media forms and antiquated media use, as well as repeated patterns and enduring technologies. To make the reader aware of historical parallels and points of comparison, we allow ourselves to make references both forward and backward in time.

It is when media become part of institutions, specific activities, or procedures that they manifest as something at once forming and being formed. For this reason, we dip into a number of spheres or contexts to illustrate the importance of media for and in the societies that have embraced them. Administration is one example, as are religion, science, art, and economics. Administrative functions have not only used media to realize their objectives. Media have also defined what it means to administer, how systems of administration have been enacted, and for what purposes. Here, media can be understood as infrastructures that institutions are built around. Just like other physical infrastructures, they have been planned and constructed in



accordance with the needs they are intended to meet, but once established, they have also determined which routes are accessible. As infrastructures, media have tended to be taken for granted and rendered invisible – especially after becoming part of everyday routines. Letter-size and A4 paper are often not considered media simply because they are a constant presence. In what follows, we will be bringing a number of such media out of the shadows.

The history of the media has been described and interpreted in many ways. To illustrate different schools of thought and perspectives, we have chosen to include a range of voices (alongside our own). Seventeen text boxes each present a different theorist and his or her take on a range of media phenomena. Some of these names are more familiar, such as Marshall McLuhan (on the media as the message), Elizabeth Eisenstein (on the printing press as an agent of change), or Walter J. Ong (on oral and written culture). Others are less well known but equally significant contributors to the research field from recent decades: John Durham Peters (on dialogue and dissemination), Sybille Krämer (on the messenger and transmission), and Cornelia Vismann (on the mediality of the law). The basic idea behind presenting these theorists – and others could, of course, have been included – is to give the reader differing perspectives on how the history of the media can be described and explained.

This book presents a broad media history, and we have opted to be geographically inclusive. Nevertheless, a significant proportion of the book's examples are European or Western. We, the authors, are three Swedish media historians, which is reflected in our areas of expertise and research. In some cases, however, the specific examples are not only particularly illustrative or eye-opening but are lesser known to an international readership – hence, we believe that some of our contributions will give new perspectives. A history from the Big Bang to the present day simply cannot make any claim to completeness or equitable representation of all times and places. Rather our book is a synthesis of major characteristics of media history; if you do not know when, where, and how paper was invented, have never heard of Johannes Gutenberg, or are uncertain when moving images began to be projected, you will be enlightened. Our narrative is not one of breakthroughs, revolutions, and innovations, however. Overlaps, repetitions, inertia, and interplay are just as important – consequently, there are no given centres and no given peripheries.

## In the Beginning Was ...

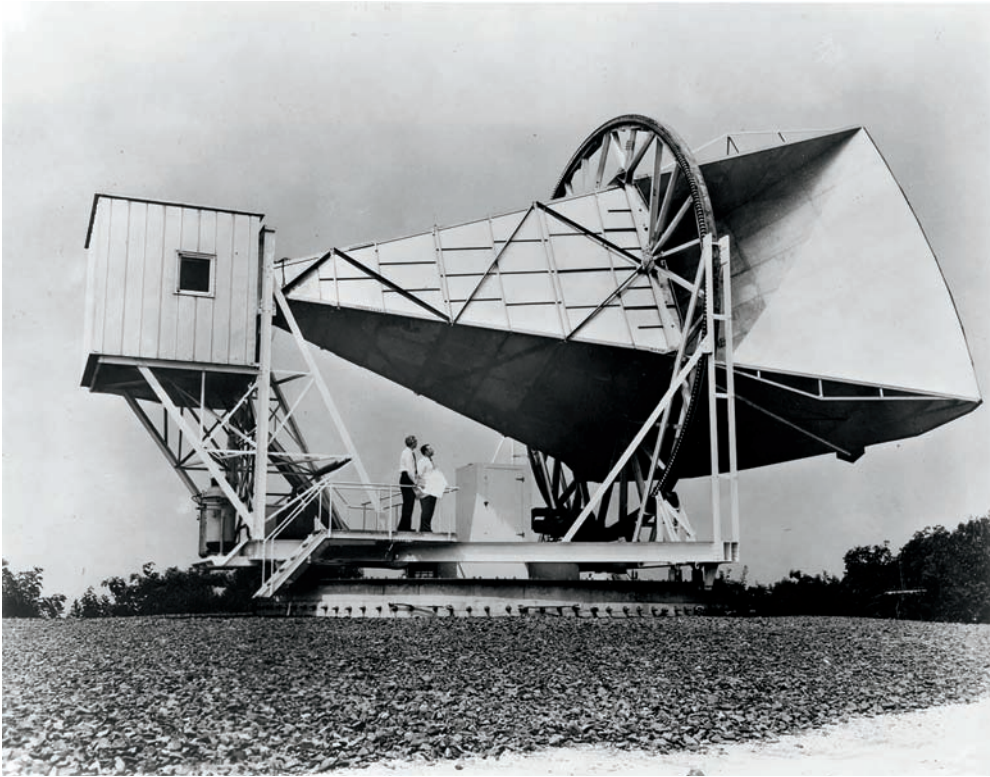


... a big bang – or a few words. Different theories offer different explanations to the origin of the universe, but in many of them it all starts with sound. According to the theory of a big bang fourteen billion years ago, the universe has expanded from an original state of high density and temperature. No audience equipped with eardrums could hear the waves as sound, and the low frequency made it unnoticeable for human ears anyway, but a cosmic background radiation originating from the beginning of the universe can still be observed. The radiation can appear as a light but was first registered as a noise.

Is Big Bang a media phenomenon? To astronomers and physicists at least, it is obvious that the radiation carries information – other sciences might call it data – about the origin of the universe, whether human beings observe it or not. Yet, as with all other signals, it takes a receiver to transform it into something that can be heard, seen, or registered.

According to Claude Shannon, founder of the modern communication theory, the communication process involves a number of components: an information source, a message, a transmitter, a channel, and a receiver. The information source produces a message, which is encoded into a signal by a transmitter and sent through a channel. A receiver at the other end of the channel decodes the signal into the message that was sent – if no disturbance has corrupted it on its way. Shannon also included noise in his model: everything interfering with the message as it travels through the channel.

Shannon published his communication theory in 1948, while he was working at the Bell laboratory in the US, founded by the telephone pioneer Alexander Graham Bell. It was radio physicists working at the very same lab that first registered the cosmic background radiation. In the mid-1960s, Arno Penzias and Robert Wilson took over a horn antenna in New Jersey that had been used to detect signals from Telstar, the first communication satellite. While they experimented with a way to detect weak signals, the two radio physicists tried to eliminate the impact of disturbing noise. After measuring and accounting for noise sources such as New York City, broadcasting, and pigeons nesting in the antenna, they could still detect a low and steady noise that seemed to come from all parts of the sky. When they were awarded the Nobel Prize in physics in 1978, they were said to have been the first to have *listened* to the birth of the universe. If the Big Bang was no media phenomenon from the beginning, it certainly was for Penzias



Modern media technologies such as radio antennas, telescopes, cameras, and computers permitted pathbreaking research on the origin of the universe and the evolution of species. Without their radio antenna, Arno Penzias and Robert Wilson would not have been able to detect cosmic background radiation. The fifteen-metre-tall Holmdel Horn Antenna in New Jersey at Bell Telephone Laboratories was built in 1959 for pioneering work in communication satellites for the National Aeronautics and Space Administration (NASA). Nasa Flickr Commons.

and Wilson in 1964. The signal could not have been registered without the receiver.

In older beliefs, the world is understood as a creation of God, but they also associate the origin with sound. The Jewish Torah as well as the Christian Old Testament explain that God in the beginning created heaven and earth. What followed was a series of commands bringing forth land and ocean, day and night, plants, humans, and animals, everything following the same pattern: “God said” – “and there was.” In John 1:1 it is emphasized: “In the beginning was the Word, and the Word was with God, and the Word was God.” The word in Hebrew

merges the saying and the doing completely: *dabar* means word as well as action – to say something is an act of creation.

Allah in the Quran used words as well, but here the almighty spoke to heaven and earth directly: “He turned to the sky, which was smoke – He said to it and the earth, ‘Come into being, willingly or not,’ and they said, ‘We come willingly.’” It is not only within the Abrahamic religions where the Deity creates with spoken words. The creator in the Inca tradition is Viracocha, and one prayer gives this information: “O Viracocha, who ... said, ‘let this be a man and let this be a woman,’ and by so saying, made, formed, and gave them being.” There are religious exceptions though, as in the creation narrative told by the Dogon people in West Africa, where God creates humans by painting them. Still, in most religions, words not only are descriptive – they create. The spoken word is the medium of gods.

A history of media can commence way back – at the beginning of everything. Yet, it might seem odd to start at that point. However, media, communication, and information are not only topics studied by researchers within the humanities and social sciences. Media history could also be written from the perspective of biology and geology to name a few. These sciences are mostly dealing with media and communication beyond human cultures, but the concepts and models they use are often taken from more familiar media environments.

## Geomedia



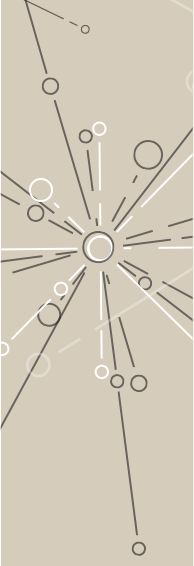
That the historical hub of the computer industry is located in an area named Silicon Valley is one sign among many of the geological origins of the digital society: Silicon is an important ingredient in the transistors and microchips vital to computer processing. High-tech industries and research institutes were established in the area in the 1940s, and the name Silicon Valley started to spread in the 1970s. The material components of the technology, however, have a history reaching back billions of years. Over 90 per cent of the earth’s crust is made up of silicate minerals. In 1823, the Swedish chemist Jacob Berzelius was the first to isolate and characterize the element in its pure form. In mid-twentieth century, silicon became a raw material used in computer electronics. New media technologies, hence, have the ability to bring prehistories to the surface in a way that was previously unimaginable. Today, when our media devices and infrastructures all

depend on silicon and other minerals, media scholars have started to take an interest in the geological histories of digital communication.

In the history of our universe, some developments have been very rapid, while others have been incredibly slow. Already during the first second after the Big Bang the building blocks of atoms were created – electrons, elementary particles, quarks. The same seconds saw some of these quarks combined in pairs and triplets to form neutrons and protons. After that, however, it is estimated that it took half a million years for the temperature to be cold enough for electrons to connect to neutrons and protons to create atoms. Most of the atoms were hydrogen, but helium and lithium were also created. Gravity pulled atoms together into giant gas balls. The pressure in the centre of these gas balls increased the bigger they got. Gradually, the temperature in what became the first stars reached millions of degrees. These temperatures triggered nuclear fusion reactions where atoms collided, electrons switched places, and new atoms were created: carbon, iron, magnesium, neon, oxygen, silicon, and about twenty other elements. When gravity made stars collapse, they exploded and made elements fuse into new elements. The history of our universe is in large part a series of such repeated processes: Gravitation pulled dust and gas clouds together, the pressure and temperature increased, causing new explosions and the collisions of atoms into new constellations.

The earth is about four and a half billion years old, made up of the matter distributed by exploding stars and pulled together by gravity. The reason we know the age of the earth is that radioactive isotopes function as timers that make it possible to calculate time spans. If the rate of radioactive decay is known, it is possible to estimate when a rock was formed. For shorter time spans it is possible to analyze sediment or ice. Drill cores from Antarctica and Greenland have documented almost 800,000 years of history. To make this kind of analysis possible, we must first acknowledge that “rocks are the record keepers of Earth history,” as the mineralogist Robert Hazen has stated. To think of geological layers and sediments as media is not a new idea. As did many of his predecessors, Charles Darwin imagined remnants in the ground as history recorded in print – if not very complete. In his now-classic book *On the Origin of Species* published in 1859, he used language, literature, and print as metaphors to explain why the geological layers were so hard to decipher:

For my part, following out [Charles] Lyell’s metaphor, I look at the natural geological record, as a history of the world imperfectly kept, and written in a changing dialect; of this history



## The Messenger | SYBILLE KRÄMER

What is a medium? Many of German media philosopher Sybille Krämer's works have addressed this question, which seems so basic that most media scholars skip over it. In one of her books, translated as *Medium, Messenger, Transmission* (2015), she attempts to shed light on the issue by analyzing one of the most classic of transmission technologies: the messenger. The idea is that by identifying specific characteristics of the messenger, we can understand what a medium actually is.

As with all media, the messenger as a construct assumes the existence of two parties separated by time or space, who may also have unequal knowledge. He – for Krämer, the traditional messenger is a man – bridges the gap by setting up a social relationship between the parties but without eliminating the gap. Occupying this intermediary position between people and worlds makes the messenger important. However, he does not act or speak on his own behalf, always being someone else's representative and corporeal extension. The messenger intervenes as a third party between sender and recipient; he is the person who facilitates the contact between them.

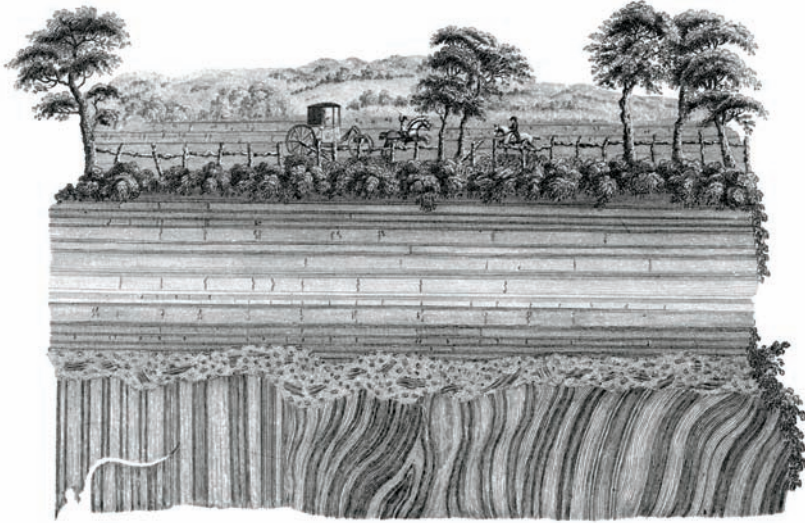
The task of the messenger is to keep the message intact in his memory while moving between the parties. The bodily memory and the physical movement suggest that transmission is always a material process – without a material carrier (a body), there can be no transmission. However, the messenger remains indifferent to the content of the message and doesn't need to understand its meaning.

Thus he is easy to replace, whether with another messenger or another media technology.

According to Krämer, the messenger ideally fades into the background, disappearing behind the message he carries: The messenger is not the message – that remains the information he has been sent to deliver. Yet, he may not always be reliable or successful in his task. He is frequently a source of inaccuracies, breakdowns in communication, and information noise. And while he usually hides behind the message being delivered, breakdowns and noise bring him into focus as the means of transmission and as the third party he will always be.

Krämer admits that her analysis of the messenger doesn't capture all of what a medium is – or can be. One limitation, for example, is that the messenger model doesn't take account of the variations in transmission capacity between different media. Some media transmit visual signs – and can do nothing else – while others transmit sound. One medium is not necessarily interchangeable with another, as the messenger analogy suggests. Since any given medium always has a limited transmission capacity, the sender is not truly free to send any message they like. Krämer's inventive attempt to answer this apparently simple question (what is a medium?) is nevertheless an invitation to explore further. What other figures and things can function as media? What types of relations do they create? How are they rendered invisible while they work, and what stands out when they fail?





“Rocks are the record keepers of Earth history.” The layers of sediment and fossils shown here document life that once flourished, amid the disruptions caused by volcanic eruptions and changing climate and sea levels. James Hutton, *Theory of Earth* (1795).

we possess the last volume alone, relating only to two or three countries. Of this volume, only here and there a short chapter has been preserved; and of each page, only here and there a few lines. Each word of the slowly-changing language, in which the history is supposed to be written, being more or less different in the interrupted succession of chapters, may represent the apparently abruptly changed forms of life, entombed in our consecutive, but widely separated formations.

Geologists have tried to visualize the incomprehensible time spans using the concept of deep time, a translation of billions of years into spatial relations, corresponding to the layers and sediments left over time. Understood in this way, history is always present in the form of traces and imprints.

The first media historian to use deep time as an analytical framework was Siegfried Zielinski. Without doing geological excavations proper, he used the framework to uncover a history beyond the pre-conception that media have developed from primitive and homogeneous forms into diversity and the fully evolved. In the geological layers we find traces of a plurality of life forms, developed to master the climate and ecosystems of their time. Zielinski argued that there is a

similar plurality of hidden dead media to be excavated in the records of human history. In his book from 2002, later translated as *Deep Time of the Media: Toward an Archaeology of Hearing and Seeing by Technical Means*, he examined the surveillance technologies invented by Athanasius Kircher in the seventeenth century, how chronophotography was used in the early twentieth century to study movements in order to make industrial work more effective, among other things. What Zielinski wanted to show was that media technologies from the past are much more diverse than we usually imagine.

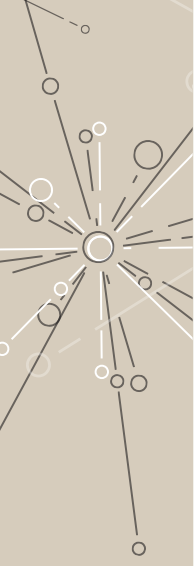
Zielinski's geological approach was mainly metaphorical, but others have proceeded in a more concrete fashion. When an ordinary computer contains as many as sixty metals and compounds, the geology of media can no longer be only metaphorical. The Finnish media historian Jussi Parikka states in his book *A Geology of Media* from 2015 that the materiality of digital media makes it a part of the history of earth. Metals taken from the storage medium of earth are now part of technologies acting as geological forces themselves. The high demand for valuable metals moves and transforms vast amounts of materials from mines to densely populated and high-tech metropolises.

The idea behind the concept of deep time was to escape a human and narrow notion of time since geological processes are usually very slow. Yet, with an accelerating consumption of raw material within industrial processes, geological changes happen within a few generations. Some researchers claim that we have entered a new geological epoch, called the Anthropocene and defined by the fact that the doings of man have significantly changed the climate and the ecosystems on a global scale.

The modern tech industry is a key actor in the ongoing relocation of earth and metals. Apart from silicon there is a high demand for copper (for circuit boards and microchips), lithium (for batteries), gold (connectors), germanium (semiconductors), tantalum (capacitors), erbium (fibre optics), and many others. The last two are so-called rare-earth metals found only in low concentrations together with other substances. A single telephone or computer may contain minerals from five continents, some of them mined in conflict areas and under environmentally harmful conditions. Several of the substances are now more concentrated in urban areas than in the mines they originated from. The copper content of a mobile phone can be as high as 5 to 15 per cent, much higher than in the ore itself.

Seen in a long perspective, the circuit boards and storage units of computers are part of a history beginning in the first stars, continuing in the geological layers of earth and modern production facilities, for a





## Dialogue versus Mass Communication | JOHN DURHAM PETERS

Socrates and Jesus have often been used to illustrate opposing traditions within Western cultures. Why not have them illustrate main positions within communication theory? This was what American media scholar John Durham Peters set out to do in his book *Speaking into the Air* from 1999. Socrates's dialogues are often celebrated as communicative ideals, where equal partners come together in conversations characterized by participation and mutual understanding. Peters compares this ideal communication model with the one represented by Jesus in the Gospels, in particular the parable of the sower.

In the Socratic model – Peters is mainly referring to Plato's *Phaedrus* – communication can be understood as a kind of erotic exchange rather than an exchange of information. Those joined in conversation are both fully present and, as in ideal love, ideal conversation knows no master or slave. The one speaking directs the words to the one listening, and nobody else. A dialogue is where souls are united.

Socrates's emphasis on communication with mutually present participants can explain his skepticism towards written communication. The written word can theoretically communicate with everyone – but it is lifeless. Written communication corrupts face-to-face, personal communion by bringing in voices from those who are absent. A text is no interlocutor; if it is proven wrong it keeps repeating itself. It cannot answer questions or answer back.

Jesus of the Gospels, in Peters's account, represents a very different idea of communication – mass communication.

Where Socrates directs his words to specific listeners, Jesus spreads the seeds indiscriminately: "He who has ears to hear, let him hear." Some seeds fall on rocky ground and will never grow. Others start to grow, only to be burned by the sun. Merely a few of them will fall on fertile ground and produce a rich crop. The sower is a wasteful broadcaster, speaks into the air, and surrenders his control over the message. He lets the receivers interpret it themselves. Not everyone will interpret the message in the same way – some will even misunderstand it completely.

Where the Socratic model is aiming for unity and consensus, the sower creates an opportunity for pluralism. Socrates's dream is perfect communication, a unity of souls. Jesus openly declares that communication is difficult, that messages sent not always match with messages received. Misunderstandings – and creative interpretations – are always possible.

A long tradition of media criticism has lamented the corrupting forces of mass communication and argued for the need to replace it with dialogue. For Peters, Jesus represents a more realistic model, one that accepts miscommunication and tolerates the plurality of meaning. One of the first scenes in Monty Python's *Life of Brian* (1979) shows Jesus standing on a mountain talking to the crowd beneath. At first, we clearly hear his voice, but as the camera zooms out and captures the listening crowd, we can hardly hear him. Someone at the back shouts: "Speak up! I can't hear a thing!" Following Peters, the scene seems very realistic. Not even the son of God can take it for granted that His messages are successfully received.

moment facilitating communication as part of digital devices, only to end up in recycling stations and landfills. Even though several metals are rare and expensive, a functioning recycling system has been slow to develop. Tons of e-waste are still dumped in the Global South every year. Some of the metals are extracted, while others become part of dumps where the layers of discarded devices bear witness to the recent media history of the 2000s.

This movement, from geological layers to dumps, can be seen as a kind of media transfer, from the storage medium of earth to electronic waste. Such an account may seem far-fetched. Yet, it reveals modern media – often understood as cloud-like and immaterial – as material constructs, built out of substances created billions of years ago. Present-day computer technologies are made up of finite resources, and the excavation of them has a geomorphological impact.

## Biomedica



Digital media are often talked about as living entities, using terms from biology. The media ecology is populated by (memory) cells, (computer) viruses, (web) spiders, bugs. But the relationship also goes the other way. Biological science frequently references the conceptual world of the media, not least when it comes to the inherited traits that are stored and passed on via our DNA “code.” During the advent of molecular genetics in the 1950s, DNA was commonly described as a telegraphic Morse code that transmitted information from one generation to the next. As time passed, other media forms were mobilized as metaphors. When the human genome sequencing project was completed in the 1990s, it was declared: “We have discovered the human alphabet – what we now have to do is put the letters in the right order and make a sentence. Only when all that is done shall we have the book of life to read.”

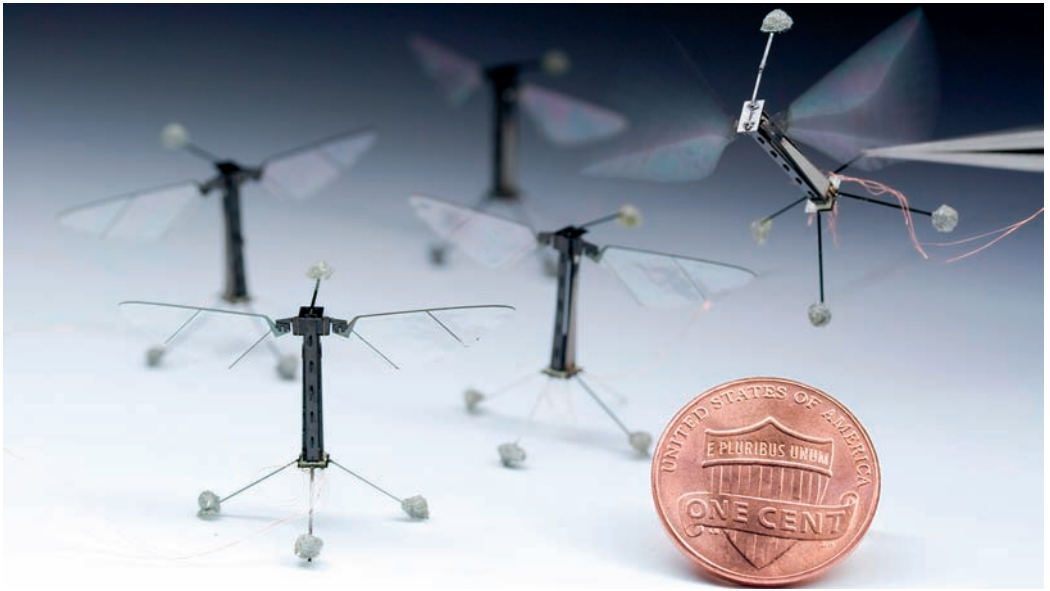
The code combinations are usually represented by letters (A, G, C, and T), but these days the genes are no longer interpreted in terms of sentences and books. Modern biotech treats DNA as information. In the borderland between genetic code and computer code, living bodies become the media carrying the information about their origin. DNA thus becomes something that can be archived, searched, copied, edited, and programmed. The information can be transmitted or translated from a biological carrier to a digital one, and back again. However, the inherent properties of DNA – the fact that the four nitrogen

bases always pair up in the patterns A-T and C-G – can also be used to construct biocomputers that solve mathematical problems.

Have living bodies and DNA always been forms of media and information? On one hand, one can take the view that bodies become information carriers only in their interaction with modern technology, which enables the coded DNA to be deciphered and read. On the other hand, communication, media, and information needn't require humans as senders and recipients. We are used to thinking of information as something with a semantic intent, a meaning that people interpret in order to create understanding. However, the founder of communication theory, Claude Shannon, didn't see it this way at all. He was an engineer, and his communication theory was based on mathematics, specifically Boolean algebra in electronic circuits (off and on, 0 and 1): "Frequently the messages have *meaning*; that is they refer to or are correlated according to some system with certain physical or conceptual entities. These semantic aspects of communication are irrelevant to the engineering problem. The significant aspect is that the actual message is one *selected from a set of possible messages*." A media channel functions as such if it can convey not just one, but several possible messages. From this perspective, a cell is a medium for DNA information, since the cell carries specific combinations of the units A, G, C, and T but could (with other senders/parents) have carried other combinations.

The postwar years saw communication theory break through across a broad front. Telephone networks and computers weren't the only things that could be understood as information-processing systems – so could human societies and animals. Norbert Wiener, one of the leading lights of cybernetics in the 1950s, thought for example that organisms and computers (and many other devices) changed and adapted depending on the incoming signals from the outside world. Organisms processed sensory signals and devices processed electrical ones, but the principle was the same. Shannon and Wiener's conceptual frameworks were used to describe everything from mass media and opinions to nerve fibres and birdsong. Ethology, the study of animal behaviour, is a typical example. One of ethology's founders, Konrad Lorenz, wrote in 1949 about the inbred "signal code" that jackdaws and greylag geese exhibit: "The mysterious apparatus for transmitting and receiving the sign stimuli which convey moods is age-old, far older than mankind itself."

Applying communication analysis to the animal world's signal systems helped to expand the understanding of what constituted in-



Flight of the RoboBee. Today mini robots are often modelled after biological creatures, such as bees. At Harvard Microrobotics Lab, researchers Kevin Ma and Pakpong Chirarattananon have built swarms of RoboBees. Photograph by Kevin Ma and Pakpong Chirarattananon, US National Science Foundation, Alexandria, Virginia.

formation – and thus how media could be constructed. From this perspective, the world is full of information (or data if you will): things that make a noise, smell, display themselves, conduct heat, or can be felt on the skin. No animal species can process all that information. The senses of every animal work like a noise filter, with evolution constantly selecting the perfect adaptation that registers only the information necessary for the survival of the species. The female grasshopper’s auditory system, for example, reacts only to the sound frequency that the males of the same species play at – they are deaf to other frequencies. The body is a medium that signals to friends and foe through songs, colours, scents, and other means. In a description of how female krib fish stretch out their ventral fins to *look like* they are carrying more eggs than they actually are, the ethologist Sverre Sjölander explained that it is not “a question of whether the fish have come up with a deceitful message, that is then faithfully and without distortion conveyed by a medium, but that ‘the medium is the message,’ to quote McLuhan.” The lie is contained within the actual medium, in the body that has been adjusted to look larger than it is. The animal kingdom’s media history is therefore largely about how species adapt

in an attempt to attract, look threatening, or conceal themselves, while at the same time developing their capacity to see through the bluffs of others, spot the camouflage users, and hear those who barely emit any sound. Just as geology is characterized by deep time, so is the animal kingdom's communicative evolution.

Studies of how animals communicate have also influenced the development of digital technology. For a long time, the human being provided the model for a thinking machine, but since the 1980s research into artificial intelligence has drawn inspiration from simpler entities. Insects and other small creatures may be less advanced individually, but in a group, they are able to perform complex tasks: coordinating actions and building intricate structures, synchronizing movements and operating in self-organizing swarms. Since it has proven difficult to model the human brain in digital form, attention has turned to developing numerous small robots that work, for example, like termites. But in order to construct media that operate like insects, one must first begin to consider insects as media. Insects and other organisms can hence be perceived as technologies that have evolved through their interaction with their surroundings. They take in, process, store, and send out information, regulate their actions depending on signals from the outside world, act in coordination with others, and connect up in networks. The natural corollary of this is, of course, that the human body can also be seen as such a technology.

## ■ ■ ■ The Talking Human

Media historians have only recently started to take the domains of geology and biology into account. That oral communication should be part of media history is still contested. It is stated in one recent textbook that “in the beginning, there was no medium, literally no in-between.” “Information was delivered in person, whether to an individual or to a crowd.” Face-to-face communication is sometimes described as “non-mediated communication.” In this perspective, speech is not mediated because no technology is used to transmit it.

Yet, there *is* something between the one speaking and the one listening – the sound of the human voice. Oral communication requires a coordination of thought and mouth, facial muscles and oral cavity trained to make sounds, as well as ears fit to distinguish the meaningful ones. One way to interpret this is that the human body was the first technology humans learned how to use. It was not created fully

developed but has evolved over time to function as both a transmitter and a receiver.

When oral communication developed – and why – is a debated issue, difficult to resolve. Some scientists have claimed that it is one of the most difficult research questions to answer. Since the inquiry has to do with the origin of humans, the search for a scientific answer has at times been controversial for religious reasons. In 1866, the Linguistic Society in Paris banned discussion about the origin of language all together. A British ban followed in 1873. For a long time, the whole issue was considered dead.

Yet much research has been presented in recent decades. No single discipline can claim to deliver a final answer, but pieces of the puzzle have come from archaeologists, linguists, biologists, and neuroscientists. Several hypotheses have been presented, but there is still no consensus on how to explain the development of speech and language. The most basic questions are among the most controversial: Are the human brain functions the prerequisites for language development, or is it rather language that structures our minds? Is it genetics and biological factors that explain the evolution of language and speech, or is it cultural factors and geography? Did language develop at a sudden moment, or did it evolve gradually? Are modern humans the only species to communicate with oral speech, or did now-extinct ancestors have similar abilities?

Anatomically modern humans developed around 300,000 years ago. The ability to speak requires an oral cavity and larynx that makes sounds possible to produce. With a lower position of the larynx, modern humans can produce sounds that would have been anatomically impossible for our ancestors – with a possible exception for the Neanderthals. To the bodily functions needed to develop speech we can add the structure of the vocal cords, tongue, and lips, and controlled breathing. One hypothesis is that the driving force behind this evolution is that individuals with these abilities have been more successful.

Most researchers agree that the spoken language of human beings differs from oral communication among other animals. Many species can produce sounds to warn, call for their cubs, or attract mates. Such calls are generally instinctive reactions rather than controlled utterances. A human equivalent is laughter – difficult both to suppress and to evoke on command. An important difference between animal sounds and human speech is that the former are what semiotics label “indexical,” expressions of emotions or instincts. Human speech is most often symbolic, which means that the relation between

the sound and its meaning is arbitrary. To be able to communicate using oral speech, humans need some kind of agreement or cultural convention establishing the meaning of the sounds.

Humans also have the ability to learn new sounds, or combinations of sounds. Some animals have that ability as well, but it is often limited to the mimicking of sounds produced by someone else. Other animals, such as dogs, may recognize certain words or phrases (like “fetch the ball”), without the ability to reproduce the sounds themselves. Several species, especially apes, use gestures and “sign language,” and this form of communication seems more controlled by will than their sounds. Yet few, if any, can combine signs into something that resembles sentences.

Since our closest relatives among the apes have limited oral abilities, but can learn to use signs, some researchers have suggested that gestures and signs developed primary to oral speech. From such a perspective, the one walking on two feet has an advantage over apes because arms and hands are available as tools for communication. In 1964, the French paleoanthropologist André Leroi-Gourhan proposed that the human condition is defined by our ability to stand on two feet. When hands are no longer used to support the feet, and the mouth is no longer used for carrying items, the hands and mouth are suddenly available for a whole range of things. The first species among our ancestors to walk on two feet, *Homo ergaster* two million years ago, was also the first to leave developed tools behind.

Modern sign language shows that hand gestures together with facial expressions are excellent communication tools. Yet, if gestures were so useful, why bother to develop oral speech? Supporters of the gesture-first hypothesis argue that speech is also a kind of bodily gesture. The movement of hand and mouth is controlled from the same part of the brain. Speech is more practical than hand gestures in some situations though. Speech makes communication less dependent on vision and light. Using speech, we can communicate in darkness, and by raising our voice, we make ourselves heard from a distance. These practical benefits are highlighted by those supporting a speech-first hypothesis, while others argue that speech and gesture may have evolved side by side.

One important reason why it is difficult to know exactly how and when speech developed is that few traces are left behind. Archaeological findings can yield some clues, but they are often difficult to interpret. As stated, Charles Darwin complained about the geological



record being incomplete. The theory of evolution was hard to prove because very little was left documenting the actual origin of species. Almost one hundred years after the publication of Darwin's pioneering work, however, another storage medium was discovered: DNA.

One of the genes that has been closely examined has been suggested as vital to human speech: *FOXP2*. It is found among several species, but the one carried by humans has mutated since we got it from our ancestors. The reason why it is described as a speech gene is that humans with a defect form of the gene have difficulties speaking. At the same time, most researchers seem to agree that *FOXP2* co-functions with and activates several other genes. Human speech requires a mental capacity as well as a motoric function. The genes are obviously crucial, but which ones are the most important has not yet been established.

From an evolutionary perspective, speech can develop and spread only if it benefits the ones who are speaking. Speech would have been important to share experiences and knowledge but was not the only way to communicate them. Many skills can be demonstrated, such as fishing, hunting, fire making, and preparing food. The one observing can learn by mimicking. This cannot be the only reason for speech to develop. Another theory argues that speech evolved as part of social power struggles, in order for some to recruit allies against others. Such social games, however, are also common among primates without the ability to speak, so this explanation is not fully satisfactory either. According to yet another theory, speech developed to manage simple forms of labour division. Small groups of hunters, for example, needed a way to communicate where a large prey was to be found so that others could collect it. As knowledge about animal migration and the methods needed to hunt were highly valued, elderly and experienced individuals might have functioned as memory banks within the groups. Used to facilitate knowledge transfer, this kind of speech would benefit the survival of the group.

For speech and language to develop and spread successfully, mastering a limited number of sounds or signs must have been an advantage from the beginning, possibly two or three million years ago. More advanced languages developed over time. Yet, for a rudimentary information transfer to take place, a few symbolic sounds or phrases might have made a significant difference. When more mature languages were established, they created new opportunities to share knowledge, establish social bonds, plan for the future, and remember the past.



Things and places could be given names and people could fantasize about places beyond this world. Those without access to the spoken word were essentially different from those who had mastered it.

We cannot forget about the different ways to communicate beyond speech, however. In a textual culture like ours, it is easy to imagine that cultures without access to text must have relied mostly on the spoken language, the poor cousin of text, so to say. Yet oral cultures have generally paid attention to a broad spectrum of senses. Ears register speech, but also wind, animals, and running water. Materials, surfaces, and shapes can be examined by touch. Objects and places may have distinct scents, and everything we put in our mouth can have a taste. The sensorial spectrum that is reduced in textual cultures is often vital in oral cultures. Prehistoric humans experienced the world with the whole body.



## Doing Things with Words

Spoken language is a medium that makes the absent present and the distant close. We can talk about past times and future plans. We can talk about people who are not with us, about places far away, and share the thoughts of others. The spoken word makes it possible to remember what is no longer present and imagine what is to come.

Some researchers argue that language developed to support this kind of time travel. Linguists and psychologists use the concept of recursion to define this basic function of our language and mind. Recursion refers to sequences in which instances of one category are embedded inside another. Everyday gossip usually follows such a pattern: “John said that Linda said that Charlie said ...” What Charlie said is included in what Linda said, and what Linda said is included in what John said. In theory, such sequences can be of infinite length. In reality, they are more limited, but only highly developed brains can keep track of them.

How and for what purposes prehistoric human beings used spoken language is impossible to know for certain. Texts that are known or assumed to be transcriptions of oral narratives are not reliable as sources if we want to know how speech was used in *prehistoric times* – usually defined as the period before the invention of writing systems. To study oral cultures that have survived until today (or until recently) might also be problematic, since such an approach assumes that oral cultures never change. Still, recurring patterns in oral narratives and



Among the first people to map oral narrative patterns were the American literary scholars Milman Parry and Albert Lord. In the 1930s, they travelled around the Balkans (in Serbia and Montenegro) equipped with a Parlograph dictaphone and a recording device that stored local songs on aluminum discs. The photograph from the mid-1930s shows Nikola Vujnovic at a *pension* in Dubrovnik about to play the *gusle*, a string instrument. He assisted Parry and Lord with transcripts and interviews. Milman Parry Collection of Oral Literature, Harvard University.

the way they are told can give some clues about the possible function of oral communication before the development of writing.

Narratives such as the *Iliad*, the *Odyssey*, the Icelandic sagas, the Finnish *Kalevala*, and the Old English *Beowulf* have all been studied as *oral literature*. Apart from being anachronistic – since literature has its origin in the Latin *littera* referring to written letters and records – the label also suggests that the narratives should be interpreted as fictive stories and aesthetic expressions. Narratives in oral cultures are better understood as a cross-genre blend of myths and history, wisdom and entertainment. Their social function in an oral culture can be compared to the mythological role of popular culture (as described by Roland Barthes) in the twentieth century and with the *bardic* function of news journalism: It provides a group with an identity, telling them who they are and where they belong. Narratives make the world

meaningful, define good and evil, and tell us what to strive for and what to avoid. Narratives are the glue that prevents cultures from falling apart.

The Finnish *Kalevala* can be used as an illustration. It was edited as a national epic by philologist Elias Lönnroth in the mid-nineteenth century but was based on songs with a long history in oral forms. Like many similar narratives, it provides members of a culture with a glorious past and a mythological origin. The first to inhabit the earth was a people of godlike creations – who were Finns. They have fantastic powers, but their traits were also easy to recognize among those who once listened to the songs. Here we find the struggling farmer and the skilled blacksmith, the beautiful maid and the lady's man, the evil witch and the tender mother, the youngster rebelling against the elders and the unlucky child hunted by misfortune. Their deeds and wrongdoings made them role models and cautionary cases. Variations of the themes and characters can be found in narratives from all over the world.

An interesting aspect of *Kalevala* is that several songs deal with the power of songs and singers. Only the wise can master the art of singing – and Väinämöinen is the wisest of them all:

Far and wide the news is heard  
outward the tidings travel  
of Väinämöinen's singing  
the fellow's cunning

In one part of the poem, Väinämöinen is challenged by the young Joukahainen. At first, Väinämöinen hesitates to battle the youngster, but Joukahainen persists:

Who is better in wisdom  
mightier in recalling –  
let him stand fast on the road  
the other shift off the road.

The songs that the two bring to the battle tell the stories about the creation of the world, how water and iron came to be, about birds, fish, and other animals. Joukahainen's knowledge is soon exhausted, and he is forced to continue the fight with other means: "Since I do not have the wits, I shall ask wits of my sword." Väinämöinen's songs

prove mightier than the sword, and he can actually *do* things with words alone: “he sang the cap off his head to a piled-up bank of clouds, sang the mittens off his hands to lilies on a still pool.” The songs eventually force Joukahainen into a swamp.

Early scholarship on oral literature imagined skilled storytellers to have memorized poems word for word. Rhythms and rhymes turned narratives into units easy to recall from memory. Storytellers had the function of human books who carried and transferred songs unchanged from one generation to the next. Later research, however, has shown that different performances of the “same” songs are rarely identical. Rhythms and rhymes support the memory, but narratives in an oral culture are living entities. Trained storytellers combine them in new ways depending on the audience and context, similar to musicians improvising.

Seen in a media historical perspective, notions of original versions and copies followed the invention of writing and print; they have no equivalents in oral cultures. That is why we can rarely identify individual “authors” or original creators in oral cultures, only more or less capable storytellers. If Homer ever existed, he might have been one of the more accomplished. Arhippa, one of the singers whom Lönnroth met when he collected verses for the Finnish national epic, contributed with 4,000 lines. Another Finnish singer, Larin Paraske, who was active in the late nineteenth century, had the equivalent of 11,000 lines in his repertoire. Once in written form and published as a book, the diversity of the living tradition was frozen and standardized. It makes no difference who the audience members are, the songs of *Kalevala* stay the same.

The importance of the audience and contextual factors suggests that oral narratives were part of multimedia performances. The voice gave life to characters and events, but so did gestures and the response of the audience. Those listening and watching had often heard the story before, but they were also curious about how this particular storyteller would deliver it. Storytellers have often celebrated and legitimized power by providing it with a mythological origin. Yet, oral narratives have also been used to convey gossip and insults, to expel illness, and conclude treaties. Performed in front of an audience acting as witnesses, oral agreements were binding. The words still spoken during wedding ceremonies – “I pronounce you husband and wife” – are cultural leftovers from a time when most contracts were oral, including land transfers and appointments.



## Recorded Spoken-Word Poetry | MILMAN PARRY

If ancient traditions of storytelling are still alive, how can oral recitation be studied? How should oral narratives be documented? Can recording media be used? Such were the questions asked by classicists at the turn of the twentieth century. Inspiration came from, among other places, museums. In Stockholm, for example, the Nordic Museum hired its first photographer in 1906; ten years later the museum was producing cultural-historical films.

In the early 1930s, American philologist and Homeric researcher Milman Parry travelled with his assistant Albert Lord to the remote mountain region of Sandžak (which today is divided between Serbia and Montenegro). Their aim was to do field studies and recordings of illiterate singers, so-called *guslari*, a collective term for epic bards in the Balkans. Parry brought with him a phonographic recording device that used aluminum discs as storage medium. Together with Lord, he made some 3,500 recordings, with some 700 hours of oral recitation.

Shortly after returning to the United States in 1935, Parry died; he was only thirty-three years old. At Harvard University, where he was active, his recordings were collected in the Milman Parry Collection of Oral Literature (a collection that is today partially digitized). In his posthumously published book, *The Making of Homeric Verse* (1971), Parry writes that the purpose of the field studies was to find out what “oral poetry” really was. The recordings and transcriptions of Bosnian and Albanian *guslari* showed that similar

phrases and expressions kept recurring. Maybe there was a link back to the complexities of Homeric narrative?

The Slavic epic poetry was both traditional and oral. It repeated epithets, themes, and connections, and these familiar retakes allowed *guslari* to remember songs of more than 10,000 lines, which took hours to perform and record. Regarding his recordings, Parry wrote: “We can learn not only how the singer puts together his words, and then his phrases, and then his verses, but also his passages and themes, and we see how the whole poem lives from one man to another, from one age to another, and passes over plains and mountains and the barriers of speech – more, we can see how a whole oral poetry lives and dies.”

Parry was not particularly interested in his audio recordings as media (he transcribed them). But through them he was able to show that what appeared to be literal repetitions of ancient songs were in fact compositions that changed depending on context, situation, and audience. Parry’s recordings of *guslari* revealed that repeated songs were similar, but not identical. It was precisely by recording several different variants of the same type of song – and hearing how *guslari* improvised – that Parry, and later Lord, established what in folk poetry and epic research was called formula theory. Oral poetry was (often) made up of standardized formulas, standing epithets, and phrases that enabled the *guslari* to recreate their songs each time they were performed.



## Oral and Written Culture | WALTER J. ONG

What is the difference between literate cultures and cultures that are primarily oral? The question engaged Walter J. Ong, American Jesuit priest and professor of English literature, in his *Orality and Literacy: The Technologizing of the Word* from 1982. Ong was influenced by Marshall McLuhan (among others), though he rarely used the concept of media in his work. He referred to written language as a technological invention. Still, he shared McLuhan's idea that the medium dominating a culture will shape how members of that culture think and act.

Ong started with a basic observation: The spoken word is an event in time, while the written word is an object in space – whether carved in stone or printed on paper. “Sound exists only when it is going out of existence,” he explained. Oral narratives survive only as long as people remember them. They have to be repeated to pass from generation to generation. It is not possible to return to what was said in the same way a reader can return to a text. Thus, the methods used to organize knowledge will differ significantly between oral and literate cultures. This, in turn, had an impact on the nature of the knowledge that different cultures produced and reproduced.

To preserve and transfer knowledge and collective experiences in an oral culture they need to be spoken of again and again. To facilitate memorization, narratives are usually composed of formulaic expressions and themes such as set phrases and reoccurring character types (“the beautiful princess”). Standard phrases, themes, and characters can be

recomposed and moved around, but since the memory of an oral culture is based on repetition, avant-garde experiments are not to be expected. Tradition is more valuable than innovation.

What defines the speech act in oral cultures is that a specific speaker communicates with listeners who are present. It is difficult to separate the things spoken of from the one speaking. The meaning of any oral communication also depends on where it takes place – the surrounding environment and all the things and people that exist there. The spoken word, according to Ong, serves the practicalities of everyday life, and oral communication will usually refer to concrete things that people are familiar with.

Written communication, by contrast, liberates the words from the specific time and place of their writing. The reader is often unknown to the writer, and vice versa. The writer may be anonymous or dead – the words have to (and will) speak for themselves. This separation between writer and text is important in Ong's analysis. The distance in time and space between writer and reader means that written communication must rely less on shared experiences and immediate surroundings. Writing is more suitable for communication about the general and the abstract. Literate people tend to imagine words as objects detached from specific contexts. Following Ong, it became easier for literate people to think in abstract terms, to separate the knower and the known, and to distance themselves from their surroundings.

Spoken language made knowledge and narratives spreadable, but the development of knowledge in oral cultures was far from a cumulative process with new elements constantly added to the old ones. Already 15,000 years ago, humans inhabited every continent except Antarctica, but the world was sparsely populated, and the spoken language had a limited range. One of the specific features of oral cultures is that human beings are the most important storage media for knowledge and traditions. For something to survive over time, it had to be shared, and for something to be transferred in space, humans had to move with it. When humans lived in small groups, individuals could live their whole lives without encountering a stranger. Many traditions were local, and innovations and discoveries in one place rarely spread to distant groups. If everyone in the group passed away, their narratives and traditions ceased to exist. No doubt, some know-how spread between groups, but in a sparsely populated world where people were separated by oceans and mountains, knowledge transfer was a very slow process.

Research on oral cultures has mostly focused on developed narratives and beautiful songs, such as the *Iliad* and *Kalevala*. Yet we have no reason to believe that the transcribed and remembered stories are representative of everything that was spoken. Most verbal communication would have taken place in everyday situations where information and gossip served practical functions. The evolutionary benefit of spoken language was that it facilitated knowledge transfer and co-operation in small groups. It might have been the limited range of this communication that led to the invention of technologies that enabled the preservation of information over time.



## Visual Communication: Images, Sculptures, and Counting Systems

The significance of body language to verbal storytelling suggests that oral cultures have been visual cultures. Many of the stories are now forgotten, but visual findings can still be seen. Traces found in southern Africa are even older, but starting from about 50,000 years ago we find an increasing number of visual remnants from various locations: colour pigments (often ochre), clay figures, jewellery (made of shells and animal teeth), paintings in caves, as well as carvings in stones and rocks. This major shift in human history has been labelled the paleolithic revolution. Its spread was almost global. During a period of about



10–20,000 years – the revolution was protracted, and many findings are difficult to date with certainty – caves and rocks were decorated in Africa, Europe, Asia, and Australia. The oldest finding in the Americas is more recent. The “horny little man” with a gigantic phallus carved in a cave in what is now Brazil is believed to be the first example, about 11,000 years old. If oral communication is understood to be a case of “non-mediated communication,” images might be easier to accept as media. In that case, media history stretches back at least 50,000 years.

Techniques and styles differ between locations and periods. It is difficult to write the history of visual communication as a linear progression, where “primitive” forms gradually developed into more naturalistic expressions. While realistic bison were painted in caves on the Iberian Peninsula, simple animal shapes carved on rocks could be found elsewhere. Naturalistic paintings are sometimes followed much later by more modest imagery at the same location. Paintings and carvings were produced over thousands of years, in different environments and cultures. Historical changes are rarely straightforward, and visual traditions are both long-lasting and diverse.

Animals and humans are frequent motifs in early cave paintings and rock carvings, but geometrical patterns are also common. Images from the bronze age show boats and carriages. It is difficult to establish what functions the images and patterns had for those who made them. Images of animals might have had ritual meanings connected to hunting, but the animals represented are often different from those being hunted. The animals depicted are typically large, fast, and dangerous. One interpretation is that they represent some kind of power or authority. The many clay figures showing human females with exaggerated breasts and genitals – Venus from Willendorf is the most famous example – have been understood as fertility symbols. Jewellery is often made from materials difficult to access, which is symbolic in itself. When shells from an ocean far away, or teeth from rare or dangerous animals, are used to decorate the body, they might represent social distinctions as well as inclusion in specific groups.

Some researchers have drawn on anthropological studies of shamanism of a later date to try to make sense of early visual cultures. In shamanistic cultures, the world is often divided into three layers: the ground level where humans live, and two levels accessible only to animals – the sky and the underground. Animals painted in caves underground might have served as guides in a world of ancestors and spirits. In such an interpretation, underground cave paintings were used as media to communicate with spiritual worlds, while rock carvings out



in the open were media to communicate within the group. Yet, even if this explanation is valid in specific cases, it is difficult to make generalized claims. Functions and meanings have most likely differed between locations and periods.

Most interpretations will remain speculations, but something can still be said about the significance of visual signs on a more general level. For signs to be meaningful at all there must be a culture with a shared understanding of what objects and decorations mean. For such cultures to develop, oral communication likely played a key role – so the sign's significance could be explained and shared. Yet objects, paintings, and carvings are more durable than speech. One important function of visual signs was that they preserved cultures and traditions over time.

The history of visual signs may also include various counting methods. Rhyme and rhythm made narratives and verses easier to remember when the brain was the primary storage unit. In many everyday situations though, what is needed is not long-term memory. A sheep herder who wanted to make sure that the same number of animals were gathered in the evening as there was in the morning needed other methods to remember. Numbers and numerals are late inventions. Most old languages had words for one, two, three – and many. Words specifying higher numbers did not exist, but there was still a need to count, represent and remember quantities. What made this possible were different kinds of media to externalize the memory. The first counting and memory aid was probably our own fingers – digits (from Latin *digit*) still signify fingers as well as numbers.

It is easy to imagine one finger representing one of the things we need to count, but several other systems have survived. With one hand you can count to five, and fingers on the other hand can be used to keep track of the total numbers of fives. This way it is possible to reach twenty-five on one hand and five on the other. Another method is based on the joints, fourteen on every hand. Add the nails and we can count to thirty-eight. Many other methods have been documented. The practice is known all around the world, but the specific methods differ.

Counting on fingers has clear limitations, though: our hands cannot be used for anything else while we count, and the method is not very useful if we want to save and remember the count for later. To supplement the use of fingers, cultures all over the world have used stones, shells, seeds, and similar items. In the same way as counting on fingers, the methods are based on the idea of a one-to-one correspondence

between the things counted and items used for counting: Eight shells represent eight fruits. The method makes it possible to add, subtract, and divide amounts without any advanced mathematics.

Early counting methods suggest a form of abstraction that resembles later inventions such as money and writing. Shells are symbols whose meanings depend on social conventions. One day they are used to represent fruits, the next to represent fish. Yet, we also find many examples of domain- or object-specific ways of counting, some still remaining today. In Korean, Japanese, and Chinese, object-specific counter words are needed to link numbers with the objects counted. When animals and people are linked with numbers in different ways, and small animals differently from large animals, numbers appear less abstract. Similar linguistic features are found in several other languages. Units used for quantities of specific goods or items have often survived in crafts and industries with a long history, such as agriculture and fishing. Papermaking is a more recent craft, but its object-specific units might be used as an illustration: 5,000 sheets of writing paper equal 200 quires, the same as ten reams, or five bundles, or one bale. The units are specific to writing paper and cannot be transferred

Tally sticks represent one of the most enduring media forms in human history. The Ishango bone from the Congo, which is about 20,000 years old, and the Lebembo bone from the border area between South Africa and Swaziland – believed to be about 40,000 years old – were found in the 1970s. References to similar sticks can be found in the writings of Roman author Pliny the Elder, as well as Marco Polo during the Middle Ages. Even as late as the nineteenth century, tally sticks were used as receipts in Britain. Koninklijk Belgisch Instituut voor Natuurwetenschappen, Brussels.



to other areas. The act of counting is a turn to abstraction, but the units may still be specific to the objects counted.

Like fingers, shells and stones have obvious limitations. What was needed in many situations was a medium with the ability to store the counts as inscriptions on a surface, and a format that made them transportable. Bones with carved notches found in southern Africa may have served as media of this kind. Some of them are about 40,000 years old. Tally sticks of a similar kind are still in use in many parts of the world. In Great Britain they served as legally binding receipts well into the nineteenth century. Notches were made on a piece of wood, and when the wood was split in half, buyer and seller would each have a matching piece that was unique and difficult to forge or manipulate. What they were used for back in time, 40,000 years ago, is not known, but one theory is that they were calendars, with one notch for every lunar phase. In other contexts, they may have been used as counting aids to supplement fingers and shells. Everyone today keeping track of game scores with four vertical lines and a horizontal line crossing through them is basically using the same method as our distant relatives making notches on a bone.

A shepherd counting animals with a tally stick would move the finger one notch for every sheep counted and compare the final score with previous results. One notch missing meant that an animal was lost. Prayer beads used in many religions work in a similar way. Hindu prayer beads usually have 108 beads, also common in Buddhism. Orthodox Christians may have one hundred beads (or knots), Catholics fifty-nine, and Muslims thirty-three or ninety-nine. It is often easy to keep track of the atypical or irregular, but difficult to remember what is repeated in identical forms – like many prayers in a row. This is where the medium makes a difference: the fingers move to the next bead for every prayer.

With counting aids like shells and tally sticks we have come across something that would qualify as media in a conventional sense: external objects used by man to store information in symbolic forms. These media made it possible to transfer memory and computation to external units that could be stored, transported, and shared with others. Counting aids made it possible to organize, plan, and control. Even the future became predictable for the one with a calendar – to some extent at least. Humans equipped with technologies like these lived in a symbolic world of abstract signs. For early agrarian civilizations, counting aids became absolute necessities.

## From Bookkeeping to Writing



Humans 10,000 years ago had the same appearance as us. They were not as tall and had shorter life spans, but they looked like we do. Equipped with simple tools, most people were nomads and lived by hunting, gathering, and fishing. As long as small groups lived apart, knowledge and culture developed slowly. When larger groups of people came together the spoken language could be used to share knowledge, skills, and stories. Yet when the size of the groups increased and contact with strangers became more frequent and complex, spoken language showed its limitations.

The written culture that would fundamentally transform human life was initially an outgrowth of the agrarian technologies developed along the fertile river valleys where the first nomads settled down. Traces of 10,000-year-old rice and millet cultivation have been found along the Yellow River and Yangtze River in China. At roughly the same time, wheat, barley, and beans were grown in the region stretching from the Nile and Anatolia in the west, to the Caspian Sea and what is now Iraq in the east – what is often referred to as the Fertile Crescent. The early cultivation of potatoes in the Andes is of the same date, while agriculture along the Indus Valley started somewhat later. The complex societies that developed as nomads became settlers needed new ways to organize themselves and to remember relations and transactions. Oral communication was not sufficient when laws, contracts, and taxes were to be implemented and remembered in societies that extended beyond the small group. Writing was developed to manage the information overload generated by the complex transactions in these early agrarian cultures.

The oldest written documents that we know of are dated to 3300 BC. They are clay tablets inscribed with cuneiform, produced in Ur, Uruk, Susa, and other urban centres of the Fertile Crescent. The invention of writing would change the human condition forever. Writing made memories durable and facilitated the transfer of knowledge in time and space. Yet, as with most media inventions, it was developed from a previous technology. Writing did not appear suddenly or out of thin air – it has a pre-history as bookkeeping.

Archaeologists excavating locations in Iraq, Iran, and Syria have often found pieces of clay in various geometrical forms. They have the same size as a match box and are shaped like circles, ovals, cones, pyramids, cubes, and triangles. What they were once used for or what they



These small clay tokens look inconspicuous (and similar to contemporary climbing holds). Like the later written characters that eventually came to replace them, clay tokens were primarily utensils for accounting and recording taxes and offerings. These come from the ancient city of Susa in western Iran and date to the Uruk period between 4000 and 3000 BC. Musée du Louvre, Paris.

symbolized was to a great extent unknown until the French-American archaeologist Denise Schamandt-Besserat cracked the code. By analyzing the locations where tokens in different shapes and patterns were found and comparing patterns and imprints on early clay tablets with writing, she concluded that the tokens had been used to register products such as oil, grain, and livestock. What was surprising with this coded language – and the reason why it was difficult to decipher – was that most tokens did not have any visual similarity with the products they represented. Only those familiar with the code could figure out that a circle-shaped token represents sheep, since it does not resemble a sheep in any way. Nothing is known about literacy rates at the time

when they were used, but tokens in similar shapes have been found in a wide area – from Turkey in the west to Iran in the east. The most ancient are about 10,000 years old.

The agrarian societies that were established in the region gradually developed hierarchical structures and more advanced divisions of labour. The majority of the population were farmers, while others were priests, military commanders, and kings. Gods (and their priests) required sacrifice, and kings demanded taxes. A system was needed to keep track of who paid what and how much. This was precisely what the clay tokens were used to register: an oval token represented a jar of oil, one shaped like a cone a certain quantity of grain. Other tokens were developed to document the diverse production of goods in urban centres, such as bread and beer, fabric and garments, metals and tools. To keep the records in order, tokens started to be placed inside spherical envelopes made of clay. To indicate the content, imprints of the tokens were made on the outside, together with seals representing the taxpayer and sometimes the administrator or sovereign. From about 3500 BC the imprints were made on clay tablets instead of spheres. From now on it was the imprints that represented the goods, not the tokens. A few hundred years later they became more detailed with several new shapes. It was these shapes and patterns printed on clay tablets that developed into the technology we know as writing.

A common interpretation is that writing started as pictograms and slowly evolved into abstract signs. Yet this theory does not explain every writing system. Egyptian hieroglyphs and Chinese signs are stylized images, but the older system based on clay tokens was abstract already from the beginning. Still, the shapes and how they were used became more abstract over time. At first, an oval token represented a jar of oil. When imprints were made in clay, numerical signs were added to indicate the quantity: 1 + jar of oil. The numerical signs could represent any kind of quantities – of sheep as well as grains. An imprint of an oval token no longer represented *one* jar of oil; depending on the numerical sign the compound referred to three jars or six. The jar was later separated from the oil so that one jar of oil was coded as 1 + jar + oil. A more advanced grammar was developed over time, making it possible to document all kinds of goods and transactions, material as well as imagined, everything inscribed with abstract signs. It has even been suggested that the idea of God as an invisible power, a characteristic feature in Jewish, Christian, and Muslim traditions, is a result of a mindset shaped by a written culture based on abstract signs. In Christianity, Jesus serves as a visible representative of the



invisible creator, based on the notion that “the Word became flesh.” Most other cultures imagine the gods as more concrete creatures.

Writing spread from the Sumerians in south Mesopotamia (in today’s Iraq) to other peoples in the region. Other cultures developed writing on their own. This might be the case with the Chinese sign system, and certainly with the writing systems developed by the Mesoamerican Olmecs and Maya culture. Yet, one pattern is visible everywhere writing was established: it was developed and used to administer, to register taxes and transactions, people and property. Writing made information durable and possible to move and share. It was a way to record past events and take control of memory. Writing made it possible to govern from a distance, to follow and regulate populations and action in places far away. The Gospel of Luke describes a familiar scene: “In those days Caesar Augustus issued a decree that a census should be taken of the entire Roman world.” Writing was a medium for surveillance and control.

## ■ ■ ■ Enduring Media: Stone, Clay, Rituals

The clay tokens mentioned earlier were used in rural communities that were widely dispersed, but they were developed primarily in administrative centres. This is no coincidence; it was these centres of calculation that had the greatest need for media. They were the place where transactions and information were registered and stored and could be consulted. The cities of the Middle East and Central Asia were built with the same clay on which the written characters were inscribed. With no actual cities, ancient Egypt had several religious and political centres, where every stone building was also a potential writing surface.

The oldest preserved story in writing (dated ca 2100 BC), about Gilgamesh, king of Uruk, opens tellingly with a mythological explanation for the origin of both the clay tablets and the city. Gilgamesh travelled widely to discover the secrets of the world and preserved his epic story for posterity by carving it into a memorial relic. But his legacy also included a magnificent city “that no later king could ever copy! Climb Uruk’s wall and walk back and forth! Survey its foundations, examine the brickwork! Were its bricks not fired in an oven?” This was a feat of construction that would withstand the ravages of time. Within the walls stood a city with gardens and temples, along with the tablets that preserved the tale itself: “See the tablet-box of cedar, release its clasp of



According to Egyptian mythology, the art of writing was a gift from Thot, the deity of scribes and secretary of the gods. His powers were great: Thot guided the dead into the afterlife and negotiated between good and evil. His calendar gave the year its rhythm, and his mathematical calculations maintained heaven and earth. The inscription of the Thot relief with hieroglyphs is found in the Ramesseum, the ancient Egyptian temple located in present-day Luxor in Egypt and built by Pharaoh Ramses II in the thirteenth century BC. Wikimedia Commons.



bronze! Lift the lid of its secret.” It took a city to preserve the story, but also people who kept the memory alive: “read out the travails of Gilgamesh, all that he went through.” When the clay tablets were discovered in the nineteenth century, the original epic had long been forgotten, but the tablets that resurrected it were in surprisingly good condition.

According to Canadian political economist (later turned media historian) Harold Innis, a material like stone – hard to move, long-lasting – was a key reason why the Egyptian culture was at once historically long-lived and geographically concentrated. Political power has always been keen to manifest itself in historical stone monuments that legitimized the power structure. No doubt the durability of the media and building material contributed to Egypt’s political inertia. The Egyptians were surrounded by history wherever they went, but at the same time the stories told by the monuments made it clear that no major change had taken place in the world of humankind (in contrast to the world of the gods). The social order had lasted for thousands of years – and would last many more. A life after death was ensured by the same

means. Stone-encased graves with walls covered in inscriptions served as a bridge between what had been, what was, and what would come to be. Having your name carved in stone held a promise of eternal life.

Alongside the preserved writings and buildings, another enduring object has proved the most important source of knowledge when it comes to the oldest human societies: the clay pot. Creating figures and other depictions in clay has a long history, but the production of pots and vessels – central to the transactions that the clay tokens documented – first developed in what is now China and Japan. The oldest remains of clay pots are over 20,000 years old. Around 10,000 years later – about the time when bookkeeping was being systematized – people in Mesopotamia learned the same technique, as did communities in other parts of the world. In most places, these vessels were made not just for practical use. The smooth clay became a surface to decorate, initially with geometric patterns and simple depictions of people and animals, and later with tableaux and scenes. A common motif of Mesopotamian pot decoration was sacrifices and tax payments in conjunction with religious festivals, where priests and kings would accept what the people presented in the form of grain, fruit, meat, and oil. One theory is that pot decoration borrowed from the written form by arranging scenes that could be read in a linear and sequential way, not unlike comic strips.

Yet the villages that gradually developed into larger communities and cities were not only centres of calculations and monuments. Cities became arenas for conversations, ceremonies, negotiations, performances, and public readings. Open spaces were created so that people could meet and exchange goods and opinions. On the squares in ancient Greece, where discussions and votes took place, the human voice was the primary means of communication. Many cities had towers from which a herald's news, decrees, and warnings could be delivered to the people. In the fourth century BC, Aristotle's ideal was that no city should be so large that all its citizens could not be reached by the voice of a herald.

Horace, active in the first century BC and one of Rome's most famous poets, wrote satirically about the crowd-pleasing authors "who recite their writings in the middle of the Forum or at the public baths" – while also conceding that "an enclosed space lends rich resonance to the voice." Architectural techniques were developed to direct and amplify speech and other desirable sounds, while blocking out disruptive noise. The Roman architect Vitruvius (a contemporary of Horace) suggested that buildings could function as amplifiers, but

how effective these techniques were in practice is often unclear. One example that actually appears to have worked was Roman theatres, with their circular architecture and terraced seating, which concentrically both shut out the noise of the city and carried the actors' voices out to the audience.

The herald's calls and the actor's spoken words indicate that the societies of antiquity enjoyed a greater media diversity than the preserved stone monuments and clay objects suggest. The Egyptians recorded everyday accounts and messages on papyrus, produced from the reeds that grew along the banks of the Nile – a product also exported far and wide. Other places used wax tablets, pieces of wood, and textiles as writing materials. While most of what was written on these materials has perished, the writings in stone and clay have survived. Tens of thousands of papyrus rolls are thought to have been destroyed when part of the library in Alexandria went up in flames (in 48 AD), but many collections of clay tablets were actually saved by the fact that libraries and archives burned down, since fired clay proved more durable.

Paradoxically, the Egyptian culture that considered stone to be an eternal medium was largely forgotten when the rituals and practices keeping it alive were discontinued. What has remained in memory are elements and ideas taken over by neighbouring cultures, but the stories to which the monuments bear witness are not a living part of the cultural heritage. Carving things into stone is no guarantee that they will be remembered. The culture with the longest historical memory – the Jewish culture – has few stones to fall back on. But by putting the writings in a ritual context in which they are read time after time, the memory has been kept alive. The story of the Jewish exodus from Egypt has survived for thousands of years through daily prayers and an annual festival, Passover. In this case, storage and transmission are ensured through people's ritual use of the texts.

## Connecting Empires



When empires expanded, communication systems were needed in order to connect centres and peripheries. Roads were built to transport armies, but they also formed the supporting infrastructure for a rapid transfer of information. Herodotus, writing from the perspective of the Mediterranean context in the 400s BC, expressed his envy of the Persian empire's postal system on land:

Now, there is nothing mortal that accomplishes a course more swiftly than do these messengers, by the Persians' skillful contrivance. It is said that as many days as there are in the whole journey, so many are the men and horses that stand along the road, each horse and man at the interval of a day's journey; and these are stayed neither by snow nor rain nor heat nor darkness from accomplishing their appointed course with all speed. The first rider delivers his charge to the second, the second to the third, and thence it passes on from hand to hand[.]

A similar system of couriers and horses along the main military roads was established in Rome during the reign of Augustus (23 BC–14 AD). At its peak, the network reached from Britannia to north Africa and the Middle East. Routes and the exact speed are difficult to specify since the two postal systems developed and changed over several hundred years. The Persian system seems to have been the fastest, with a maximum speed of about 300 kilometres per day. Roman couriers were responsible for the complete journey from sender to receiver – they only changed horses – and this made delivery somewhat slower. A comparison between the two systems must also take the different geographies into account. The Persian Empire was based mainly on land, the Roman included oceans and islands. Water transports were often cheaper and faster compared with roads on land. If distances are measured in time and transportation costs, north Africa was closer to Rome than northern Italy, and Syria closer than Britannia.

Decrees and regulations were sent from the central power to remote provinces. Local representatives sent back reports on harvests, taxes, criminals, and other news that the central government had to know about. The post, the couriers, the scribes, and the letters were part of a surveillance system that extended the reach of the ruler. A Persian account explained that local representatives were the “eyes and ears” of the king. The post delivered what was seen and heard to his palace. Based on the logic that “all roads lead to Rome” – and in contrast to a decentralized network such as the internet – the ancient postal systems were highly centralized. They connected provinces and centres; the routes between different provinces were not a priority.

Postal routes were vital to governing and had to be protected. Most roads were open to all kinds of travellers, but only officials had access to postal couriers and horses. Messages, couriers, and official travellers had to meet certain criteria to pass through the system. Couriers carried signs or certificates to be recognized as legitimate messengers.



## *Imperial Communications* | HAROLD INNIS

Time and space: the dimensions explored by Harold Innis were the most basic ones. That his name would become intimately connected with media history, and that his analytical perspective would form a school – the Toronto school – was apparent only late in his life, if even then. He died a few years after the publication of his most influential works, and his ideas were mainly spread posthumously.

As a professor of political economy, Innis's primary interest was the influence of staples or raw materials on a country's development – in the Canadian case it was fur, fish, pulp, and so forth. The move from cod to communication was not as strange as it may seem. In his analysis of staples, Innis paid much attention to transportation – from rivers to railways – and the relation between economic centres and peripheries that were rich in raw materials. The means of transportation that were available (canoes, trains, steamships) would determine which raw materials were exploited, the industries that were established, as well as the development of social networks. These ideas became key building blocks as Innis began to explore communication history.

Innis's media historical research from around 1950 was focused on great civilizations such as Babylonia, ancient Egypt, and Rome. His main thesis was that the media they used influenced the way empires were organized, their spatial distribution, and their ability to preserve structures over time. Media made from stone or clay were durable and had the ability to preserve inscriptions over time.

Civilizations and empires have relied on durable media in order to last.

Other media forms are characterized by their mobility: they are easy to transport or do away with transportation altogether – such as drumbeats and electronic media. Mobile and light-weight media, such as paper, are needed to hold vast territories together. Yet, media-specific benefits come with a price. Stones may stand the test of time, but they are heavy to move around. Paper documents are easy to transport, but sensitive to fire and water. To keep a spatially distributed empire together, and make it stable over time, space-binding and time-binding media need to be balanced.

For Innis, it was the materiality of media that ultimately determined political control over time and space. Yet he also recognized the interplay between media and geographical contexts, political decisions, and local conditions. Paper, for instance, had the potential to support decentralized communications since it could be produced wherever rags were available. If its production was regulated, however, paper media could instead contribute to the concentration of power. The details of history were important to Innis. What stands the test of time in his own works is not his account of Egypt, Rome, and other empires, but the general approach he developed. The idea that time and space are organized by media, and that the materiality of media matters, has influenced generations of media scholars.

Post-horses in Persia got their tails docked to mark their official status. The word diplomat is derived from the document (*diploma* in Greek) proving that a person travelled on official business and had the right to use the postal service. Those who wanted the rulers to have false information would sometimes hack the system, dress up as official couriers, and deliver messages that gave the impression of being authentic. Couriers could also be assaulted to keep messages from passing through. The Roman postal network in the east was still in use during the Byzantine period and into medieval times, but the European network fell apart along with the empire that supported it. The Persian system was taken over and developed by the many dynasties that would control the Middle East and Central Asia for the next 1,000 years.

A completely different communication system can be traced in west Africa. From the 700s AD the region was dominated by the Ghana Empire, followed by the Mali Empire and the Songhai Empire. Like empires elsewhere, they depended on media technologies to connect centres and peripheries and maintain cultures and power structures over time. Precise information on the media that kept these empires running is hard to verify, but drums seem to have played a major role. An Arabic traveller briefly described their significance in Ghana in the eleventh century: “When an audience is granted to the people ... the opening of the Royal Session is announced by the sound of a certain drum which they call *deba*, and which is made of a long block of wood hollowed out. At the sound of this instrument, the people foregather.”

To Arabian and European travellers visiting the region the drums seemed mysterious. They heard nothing but drumbeats where locals recognized words and phrases. The code is hard for outsiders to crack, but the drum language, still in use today, is both simple and effective. In several west African languages spoken words have different meanings depending on a rising or falling pitch. It is this change of pitch that the drumbeats try to mimic word for word but excluding vowels and consonants. Since this makes it easy to mix up individual words, messages need to be repetitive and redundant with set phrases providing context. One way of drumming “don’t be afraid” is “bring your heart back down out of your mouth, your heart out of your mouth, get it back down from there”; “fowl” would be “the fowl, the little one that says kiokio.” Without these elaborations, it is difficult to distinguish one word from another with similar pitch. Modern radio and telecommunications have used similar methods to make messages





Visitors have long been fascinated by West Africa's talking drums. Most talking drums sounded like human humming – at least when a skilled player like Kofi Jatto from Bekwai, Ghana, did the drumming. In 1921 he drummed a story on his Asante *atumpan* drums to the anthropologist Robert Sutherland Rattray's phonograph (and camera). Afterwards, Jatto had to translate his drumming into words that the anthropologist could understand. Royal Anthropological Institute of Great Britain and Ireland, London.

recognizable in noisy channels: Alpha, Bravo, Charlie are easier to identify than A, B, C.

The drum language made it possible to transfer messages over great distances. In favourable conditions, drumbeats could be heard over ten kilometres. With relay stations of drummers along the line, messages were transferred from one drum to the next in a short time. What the system of drum communication was used for in earlier times is not known, but it seems to have been controlled by the rulers. It has been suggested that it was used to circulate news, to send warnings, and to signal gatherings. Stories performed on drums are nowadays historical sources in themselves. The same technology that once bridged distances is now used to recount historical events and tales about ancient kings during ceremonies and celebrations.

Accounts of imperial postal and drum systems usually present them as effective services that delivered as they were supposed to and



gave sovereigns full control. What is left are historical sources primarily describing the way that systems were supposed to work under ideal circumstances and when transmissions were successful. Yet noise, breakdowns, and delays are part of most communication systems. They may be horse-based or digital – few infrastructures are perfect. The gaps and glitches are sometimes used to protest or resist those in power. The Book of Esther tells the story of a Persian king who tried to silence the oral slander circulated by women. The king was in control of the written dispatches and the couriers, but he had little power over the malicious rumours about him that spread to all corners of the empire by word of mouth. In Persia thousands of years later it was political and religious speeches recorded on tape that fuelled the resistance against the ruling shah. The mass media in 1970s Iran was controlled by the regime, but the tapes were manually copied in the thousands and distributed in secret and beyond its control through mosques and bazaars. Small media and transient communication are sometimes as powerful as large systems.



## Writing and Reading Practices: The Examples of Greece and Rome

The Phoenician alphabet, adopted and modified first by Greeks and later by Romans, was based on written signs representing sounds. That might explain the fact that Greek culture put writing in the service of oral communication, and that the spoken word often took shape in relation to written texts. Also, the speech technique developed in legal, political, and poetic contexts – rhetoric – can be interpreted as a result of written communication. Speeches were analyzed, structured, and prepared in writing. To read in silence was not unknown, but it was more common to read texts aloud. The words used to describe the act of reading emphasize that reading was meant to *distribute* the text to those listening, including the reader. It was the voice that gave life to dead letters. An important reason why texts were read aloud was that words were written without space in between them. When read aloud it was easier to recognize the words as distinct units.

That readers gave voice to and became subordinate to the texts conflicted with the Greek idea of the citizen as a free man. A free man raised his voice to express his own opinions – but as a reader he found himself to be a slave of the author. This relationship between author and reader was sometimes interpreted in sexual terms, where one was



The paintings on Greek vases often depict men in battle and women at home. In vase painting it is hence more common to show women (rather than men) writing or reading aloud to each other. Especially in the upper strata of society that vase painting usually depicted, women were literate, while those who painted the pots often seemed illiterate. Painted texts frequently consisted of random letter combinations without meaning – or, as in the case of this vase from 450 BC, arrangements of dots. In all likelihood, the vase painting depicts the poet Sappho from the island of Lesbos; surrounded as she is by other women, the image has been interpreted as an expression of female desire. British Museum, London.

the sex object of the other. An inscription from Sicily is telling: “The writer of the inscription will ‘bugger’ [*puǵίξει*] the reader.” To avoid the problem, those who could afford it hired slaves to read aloud for them.

In the fourth century BC the philosopher Plato – whose abstract theories would be unthinkable in a culture without writing – was one of the fiercest media critics. Writing moved knowledge from the mind to an external medium. To read and recite what was written by someone

else was not the same as being knowledgeable. Conversations face to face were seen as environments where insights, arguments, and conclusions could develop. Frozen thoughts in text were the opposite of oral exchanges where speaker and listener were both present. A text addressed the ignorant and the wise in the same manner. It could not defend itself, and even if it was proven wrong, it would keep repeating things that were untrue. Writing destroyed readers' memories – and made them unbearable: “It will atrophy people’s memories. Trust in writing will make them remember things by relying on marks made by others, from outside themselves, not on their own inner resources, and so writing will make the things they have learnt disappear from their minds ... they will seem to be men of wide knowledge, when they will usually be ignorant. And this spurious appearance of intelligence will make them difficult company.” This criticism did not prevent Greeks – or Plato himself – from writing and reading all kinds of texts. Philosophy, poetry, plays, and scientific ideas circulated in written form, but were also read aloud and performed. Literacy was far from universal, but it was not limited to the elite and their educated slaves. The preferred writing material was Egyptian papyrus, but due to its shortage, texts were also written on wood, lead, leather, wax tablets, fragments of broken clay vessels, and other materials. Libraries were established by private individuals as well as by officials as institutions of knowledge and symbols of high status.

Later, many of the Greek book collections were taken as booty and transported to Rome. As in Greece, literacy in the Roman Empire was spread beyond the ruling elite and the wealthy. People encountered writing carved in stones, on banners and fabric, medals and coins, calendars, letters, and decrees. Books were usually circulated among personal networks, but booksellers were available even in provinces like Gaul, Britannia, and north Africa. Some booksellers served almost as publishers and made numerous copies of requested books. In rare cases, individual titles may have been produced in as many as 1,000 copies. A more common practice was that books passed from one reader to another, and new copies were made on the request of individual buyers. The fact that written works circulated among readers who sometimes made new copies of their own and spread them further meant that several books and authors became well known throughout the empire. Still, the earnings of authors depended on patrons and not on revenues from book sales. Martial, active in the first century AD and a Roman poet who frequently reflected on the book market and the distribution of his writings, stated in one of his *Epigrams* that even

“Britain is said to recite my verses. What’s the use? My purse knows nothing of all that.” Honour and glory were the payment of poets, but such fame could also attract wealthy patrons.

Men like Aristotle and Horace had no problem spreading their written works in public. Women who wrote had more limited possibilities, in Greece as well as Rome. It was men’s voices that were heard in the public squares of Greece. Men recited poetry and spoke on politics. Norms for women were different. Women were to refrain from speaking in public and were not allowed to perform on stage. Women belonged to the private sphere, and if they wrote it was not supposed to reach the public. Manuals on education had much to say about the proper way to teach boys how to read, write, and speak, but next to nothing about a similar training for girls. Still, women did write. Painted vases and walls often depict women reading and writing. Since most women authors used male pseudonyms, they have been difficult to trace. Yet, from those who have been identified, their texts were as diverse as the writings of men. Here we find Cleobulina from Rhodes known for her riddles, Ptolemais of Cyrene who commented on the theory of music, Sulpicia who wrote erotic poems, and Hortensia known as a skilled orator in Rome. Few of their texts have survived, but they can be traced from fragments and quotations in the works of others.

The number of texts circulating in Greece and Rome would not seem impressive to a modern reader. Yet it could be experienced as overwhelming by readers at the time. The Stoic philosopher Seneca (ca 4 BC–65 AD) was one such reader, complaining that “the mass of books burdens the student.” To read more than one could digest was the equivalent of gluttony, well known from Roman feasts. In fact, many people owned more books than they could ever read: “What is the point of having countless books and libraries whose titles the owner could scarcely read through in his whole lifetime?” Seneca suspected that many people collected books “not as tools of learning but as decoration for their dining-rooms.” Those who actually read the books were told that “it is far better to devote yourself to a few authors than to get lost among many.”

The books made available by booksellers show a great diversity, covering everything from scientific works and erotic writing to cookbooks and makeup tutorials. Public graffiti is another indication of the everydayness of writing. On the walls of Pompeii, we find statements such as: “A copper pot went missing from my shop. Anyone who returns it to me will be given 65 bronze coins,” “Epaphra is not good at ball



## On Files | CORNELIA VISMANN

In the 530s, Eastern Roman emperor Justinian I ordered a codification of the laws of the empire and their adjustment to contemporary conditions. The extensive collection is called *Corpus juris civilis*. Roman law – on which all legislation in the Western world rests in principle – took shape as a collection of laws in codex form.

What does it mean that the administration of justice is based on an orderly collection of laws? Does it matter how judicial decisions are written and later administered as files in growing archives? Does it make a difference if the law is written in stone or software? If it is filed on paper or parchment? German legal and media historian Cornelia Vismann's study – translated as *Files: Law and Media Technology* (2008) – asks such questions. Vismann is less interested in what is in the files but instead focuses on the practical and administrative ways in which they have been gathered. The book is thus about how the law is literally *made*. Files are process-generating; they are both documents and activity.

By studying the “media-technological conditions of files and recording devices,” and the relationship of files to the legal system, Vismann's book is at the same time a media history of Western Europe's administration practices for 2,000 years. It begins in the Roman central archive Aerarium, with its papyrus scrolls, and its transition into the Imperial chancellery Tabularium, circa 78 BC. Using the proverb *quod non est in actis non est in mundo* – what is not kept in the records, does not exist in the world – as her point of departure, she examines the materiality

of chancellery routines during the Middle Ages, from storage in file cabinets to the practical work of clerks and copyists, who often did not understand the documents they copied. Vismann continues by describing the act of writing in chancelleries during the early modern period, where an elaborate style was increasingly abandoned in favour of a language economy where files would be written according to the same criteria. She also traces the material basis of the legal system from the Prussian administration's production of documents, which grew so fast that the principle of provenance was established, to twentieth century binders and hole punchers, carbon paper, and document systems. The paper files, which were once perceived as “comprehensive recording devices,” now faced competition from audiovisual media. For the clerks of the twentieth century, it became painfully obvious how inaccurate written files were compared with “the analog recording of events by technological media,” which set a new “standard for recording accuracy.”

It is telling that her book was published at the turn of the millennium. When files were computerized and converted into “folders” in digital interfaces, their media history became apparent. Her topic may seem mundane, but its implications are significant. When the focus shifts from content to form – from a particular legal case to more general legislative machinery, and the role of media in each – it becomes possible to expose “the part that official records have [played] in the emergence of the notions of truth, the concepts of state, and the constructions of the subject in Western history.”

games,” “Theophilus, don’t perform oral sex on girls against the city wall like a dog.”

Romans wrote and read their books in the same way as the Greeks – as scrolls. Yet, a new format was gradually introduced during the first centuries AD. The codex format – still in use today – is based on stacks of separate pages bound (or glued) together on one side and protected by a cover. Parallel to this, parchment (or vellum) made from scraped animal skins started to replace papyrus as writing material. The new codex format made books cheaper since text was written on both sides of each sheet. It was also more flexible and made it possible to produce small-size books as well as large ones, with a few pages or several hundred. The benefits of the new technology are described in many sources. Martial, the Roman poet, was an early adopter who promoted the codex in several of his *Epigrams*. One of the features that he highlighted was the mobility of the hand-held medium: “You who want my little books to keep you company wherever you may be and desire their companionship on a long journey, buy these, that parchment compresses in small pages. Give book boxes [containing scrolls] to the great, one hand grasps *me*.”

The new format made it possible for readers to reach and read specific passages and pages without having to scroll from the beginning of the text. Where the scroll stored and presented texts in a continuum that readers had to process sequentially, the codex stored texts according to the logic of a random-access memory that could bring readers to any page directly. The new format was particularly useful to professional readers who wanted to consult and jump between specific passages. Among the first to embrace the codex were the early Christians. While Jews stuck to their scrolls, the new religion was spread in the new format – a strategy perhaps to emphasize its newness.

## Silk Roads



From ancient Rome a media historical path might lead straight ahead to the European Middle Ages, the Renaissance, and the Enlightenment. Yet, there are other roads to follow. If we take roads and networks of transportation as our starting point, medieval Europe, and its western parts in particular, seems to be out of the way. The networks did reach cities like London and Paris, but they were not hubs in a global perspective. After the gradual fall of the Roman Empire,

and raids by Visigoths, Vandals, and Huns in the fifth century, Europe experienced a period of decline. Literacy rates decreased, as well as foreign trade. The use of stone as building material, an indication of skills and wealth, became less common. Europe was no longer the driving force of technological innovation, art, and science.

The new centres of trade and science, religion and architecture, were located in the Middle East and Central Asia. The roads from east and west came together in Samarkand (in today's Uzbekistan), Rayy (south of today's Teheran), Damascus, Herat (in what is now Afghanistan), Kashgar (in western China), Baghdad, and Constantinople (later renamed Istanbul). One reason why Venice became powerful and wealthy was that the city had established connections with trade centres in the east. If roads are seen as links in a global communication network, these cities were the central hubs in an age not known as "medieval" from an Islamic perspective. On the contrary, in this part of the world, the period from the eighth to the thirteenth century is known as "the golden age."

Routes on land and oceans connected the Viking trading centre of Birka in Scandinavia and Saharan oases with markets, capitals, and centres of learning in the Middle East and Central Asia, in turn connected to India and the coastal cities of the Pacific Ocean. People in general did not travel much but could still come into contact with goods and influences from afar. Silk and coins, furs and spices, slaves and diplomats, missionaries and soldiers – people and goods travelled back and forth along the route today known as the Silk Road.

Textiles were as important in this network as written texts. The word text is derived from *textum* in Latin, meaning web or woven fabric. The history of fabric as a media form exceeds written texts by far. It is also a medium where women have played a key role as producers – women weavers are still today referred to as "authors" in Central Asia. Colours, patterns, and textures have been used to store memories and remind communities about cultural traditions and social divisions. Fabrics and rugs have been used to cover and decorate floors, walls, and bodies. Precious and expensive fabrics (like silk) have been a symbol of power and rank. On the Silk Road fabrics travelled far – traces of silk have, for example, been found in graves of distinguished Vikings. Parts of the world were still unconnected to the trade networks – the Americas among them – but the establishment of far-reaching routes during the first millennium can still be interpreted in terms of an emerging globalization. Silk, in short, connected Vikings in Scandinavia with production facilities in China.



Oriental rugs not only display traditional motifs such as the tree of life and evocations of paradise, but some document symbols that were meaningful at the time the rugs were woven. Afghan war rugs from the 1980s and '90s, for example, often bear witness to the Soviet Union's invasion of the country. Many depict Kalashnikovs and tanks, others produce maps of refugees, still others show how the Soviet forces finally gave up and withdrew. Such rugs are today sought after as collectibles. The Afghan war rug is a modern adaptation of a traditional art form – though the names of those who wove them are usually forgotten or unknown, as is the case with this anonymous rug. British Museum, London.



International trade was facilitated by the recognition of common means of payment. Already the clay tokens and early writing meant that the plurality of concrete things were represented by abstract signs. They had no meaning in themselves but were used as replacements for the things they referred to by convention. Money can be seen as a development of such symbolic communication media. Coins reduced the differences between concrete things and linked them through abstract symbolic values. In practice, however, it was usually the value of the metals, rather than the symbolism of the minted coins, that mattered when money changed hands. Yet, as with bookkeeping and writing, money seemed to have the same power to arrange everything else around it. A characteristic of money – and important not least to distant trade relations – is that it must be durable as well as mobile.

The minting of coins in precious metals started about the same time in Anatolia, Greece, India, and China. Trade, travel, war, and conquests spread local coins to distant locations. Many Roman coins ended up in India, and when Vikings entered the trade routes later on, they brought coins minted in Baghdad to Scandinavia. The assembled riches and amounts – converted into today’s exchange rates – shows that trade was a billion-dollar industry. Yet, in some regions, other commodities were used instead of (or as a supplement to) metal coins. The Chinese, for example, often used bundles of silk as a currency. On the northern steppes, payments could be made in furs, with fixed exchange rates. Paper-based banknotes – initially merchant receipts – were issued in China in the seventh century. This invention was sometimes commented upon by surprised European and Arabic travellers. What distinguished paper money from toilet paper (also invented in China) was basically print.

The value of coins was also a result of the symbols they carried. Decorated with gods, kings, mottos, and declarations, coins were part of propaganda wars. The Asian conquests of Alexander the Great in the fourth century BC were followed by a flood of coins showing the face of the Greek king. Alexander’s coins would circulate in the Middle East and Central Asia for several hundred years. When the power of the Persians increased, they put their own kings on Alexander’s coins and added a Zoroastrian fire altar on the back. When the Roman emperor Trajan and his troops captured several Persian cities in 113 AD, he ordered coins to be made declaring “Persia Capta” – Persia is conquered. After the Muslim conquest a few hundred years later, new coins stated: “There is no god but God. Muhammad is the messenger of God.” The ruler of Constantinople answered with coins of his own – picturing Jesus. But since coins could travel far, those who got their hands on foreign currency were often unable to decipher the inscriptions. A Christian eighth-century king, in what is now a part of England, used an Arabic dinar as a model when he ordered coins of his own – with the result that they were decorated with the Islamic creed in Arabic. One explanation might be that the Arabic coins were so widely used that they set the standard for what coins should look like.

## ■ ■ ■ Arabic Convergence Culture

Where the roads converged, wealth and culture prospered. The rulers and merchants of the Arab world stimulated knowledge production



Like many other Muslim shrines, the Sheikh Lotfollah Mosque in Esfahan, Iran, is a building of text – built around a text. Surahs from the Quran, prayers, and poetry decorate walls, niches, and ceilings both inside and outside the building. The mosque was completed in 1619. Wikimedia Commons.

by sponsoring libraries and centres of learning. The libraries in newly founded Baghdad became the most influential, initiated by Harun al-Rashid, who was the caliph in the Muslim empire around 800. Harun appears frequently in *One Thousand and One Nights*, where he first and foremost is shown to be captivated by oral communication. He is often asking poets, slaves, and friends to sing and tell him stories, especially on sleepless nights: “I want you to tell me something that may dispel my cares and cheer me.” Yet, in more conventional historical accounts he is instead portrayed as obsessed with the written word. The intention behind the libraries of Baghdad was to gather all available knowledge under one roof – a dream reflected in many similar projects since. To make knowledge accessible, however, it first had to be translated into Arabic.

The caliph and other wealthy individuals in the empire sponsored and encouraged a large-scale movement to translate Greek, Chinese, Persian, Syriac, and Sanskrit manuscripts into Arabic. Scouts and collectors were sent from the court in Baghdad to gather as many manuscripts as possible. In some cases, defeated enemies were asked to pay their debts in texts instead of gold. The process of text reproduction was almost factory-like, with one person reading the original text aloud and a group of scribes transcribing it word for word. A single reading resulted in several copies that could be used in additional





There are few visual depictions of Arab scholars. One exception is the thirteenth-century painter and calligrapher Yahya ibn Mahmud al-Wasiti's illustration from the *Maqamah*, a collection of comic short stories written by al-Hariri of Basra around 1100. The *Maqamah* is centred around trickster figures and silver-tongued hustlers, who – often in disguise – dupe listeners with their rhetorical eloquence. The men in the library are hence perhaps about to be fooled. The illustrated manuscript (dating from 1236 or 1237) was likely created for specialized book markets in cities like Baghdad, Cairo, and Damascus. Only eleven illustrated versions of the *Maqamah* have been preserved, giving a rare glimpse into thirteenth-century Islamic life. Bibliothèque nationale de France, Paris.

readings and transcribed again. The second generation of this cycle (reading-transcription-reading-transcription) could result in as many as one hundred copies of a single manuscript.

The first priority was to translate practical works covering domains such as medicine, agriculture, and astrology – the latter, practical for anyone who wished to know the future. Gradually, translations were made of manuscripts in more varied areas. Historians have suggested that the need for Greek philosophy became apparent when Muslims were confronted with Jews and Christians. To defend their faith, Muslims needed to improve their ability to argue and debate using logic. When Aristotle and Plato were translated, they became the new models guiding scientific reasoning, especially on theological matters. The libraries in Baghdad may have served as educational institutions as well as research centres. It is difficult to estimate the number of

The Persian polymath al-Khwarizmi (Algoritmi) was likely born in Khiva, today a border town between Uzbekistan and Turkmenistan. In 1983, the Soviet Union issued a postage stamp to mark the 1200th anniversary of Al-Khwarizmi's birth – at that time Khiva was part of the Soviet Union. Wikimedia Commons.



books that were available since the buildings were destroyed during the Mongol occupation of the city in 1258. Yet the fact that parts of the collections were rescued before the destruction indicates they held at least 400,000 manuscripts.

The translation movement also gave rise to new scientific works written in what had become a common language for the scholarly community – Arabic. Of special interest in the context of media history are the contributions made by Muhammad ibn Musa al-Khwarizmi, active in the latter half of the ninth century. Digital media of today are based on the principles that carry his name: algorithms, from the Latinized version of his name, Algoritmi. It was through the writings of al-Khwarizmi that Europe was introduced to the Indian numerals, 1 to 9 and 0. He is also remembered for his method of solving equations, most of them concerning practical matters related to trade, inheritance, and the calculation of land areas.

Al-Khwarizmi's method was based on the reduction of mathematical problems into standardized equations that were solved step by step. The computations were not very complicated. What was new about his

method was its simplicity. Problems that seemed difficult were broken down into a sequence of simple operations. From instructions on how to calculate land areas and inheritance it is indeed a long way to the scripts running our digital media. Still, today's algorithms are based on similar rules and instructions on how to compute data in a sequence of steps: "algorithms are used to solve predefined problems." It was examples of such predefined problems and how to solve them that al-Khwarizmi presented.

The text that many scientific and philosophical activities centred around was the Quran, which scholars tried to interpret using philosophical methods. Research in geography was fuelled by the desire to calculate the direction to Mecca, and an important motivation for work in astronomy was the need to develop calendars and establish dates for religious feasts. Muhammad has traditionally been understood as the medium of God, the one who listened to, transmitted, and made sure that the words of archangel Jibreel (Gabriel) were written down. The word Quran itself refers to the act of reciting. Muhammad listened to the words before they appeared in writing, and when they are read aloud or, even better, recited from memory, it is the words of God that are heard. An indication of the significance of recitation in Muslim culture is the reoccurring Quran recitation completions arranged by Arabic television stations today. Contestants have to memorize and recite as many verses as possible. Yet, holy scripture is also highly visible as text throughout many mosques. As a result of the restrictions against imagery – particularly in the Sunni tradition – calligraphically written prayers and verses from the Quran decorate walls and domes.

The flood of translations and thriving scientific activities in the Arab world were facilitated by the adoption of a Chinese technology that made it easier and cheaper to produce large quantities of text: paper. Traditionally, the inventor of papermaking is said to be the Chinese court official Cai Lun. Legend has it that he had the idea to use bark from the mulberry tree and discarded fishnets to produce a fibre material, today known as paper, after observing how wasps build their nests out of chewed-up wood fibres and saliva. He presented his invention in 105 AD. As with many other media technologies, it is usually difficult to tie inventions to a single individual. Cai Lun may have improved the papermaking process, but paper was known and used in China already in the third century BC. That a court official advising the emperor got credit for the invention is no surprise though – writing material was in high demand by the Chinese state bureaucracy. The Han dynasty (202 BC–220 AD) had a massive empire to rule, and

one means of keeping it under control was to get everyone registered on paper.

Paper spread along the same roads that were used to transport silk from east to west. It first arrived in the Arab world in the form of correspondence, contracts, and lists of commodities. In the eighth century, the Arabs learned how to make paper themselves. Paper mills were first established in Samarkand and Baghdad, where the demand for paper was high. Instead of bark from mulberry trees they used mainly rags as a substitute. The introduction of rags as raw material was crucial to the future success of paper as a universally spread media technology: From now on it could be produced wherever old cloth was available. This meant that writing became less dependent on the Egyptian monopoly on papyrus. Paper made from rags was also cheaper than parchment made from animal skin. With paper produced at local mills, Arabs had the infrastructure in place needed for an expanding bureaucracy as well as increased scientific production.

Still, the success of paper – and writing – was far from immediate. As late as the 1440s when Johannes Gutenberg set up a printing press in German Mainz, he printed about a third of his 42-line bibles on parchment. The initial draft for the treaty bringing Denmark, Norway, and Sweden together in a union in 1397 was written on paper – but the final treaty was written on parchment. To be valid, a treaty needed attached seals hanging from the document, and paper was not strong enough to support the weight. While paper spread fast in some contexts, in others, people continued using old technologies. Writing entered new spheres, however, and Europe in the later Middle Ages was gradually, and at least in parts, transformed into a written culture.

## European Information Overload



British historian Michael T. Clanchy's book *From Memory to Written Record: England 1066–1307* was published in 1979, and remains one of the best analyses of written culture in the Middle Ages. Clanchy highlights the 1200s as the century of important changes in the English context. Texts were written, circulated, and read long before this, but from the eleventh century, and especially during the thirteenth century, written communication increased, particularly within the state administration. Written contracts became more common, as well as decrees and regulations, instructions for royal representatives in the provinces, and court rulings and texts as legal evidence. Ownership



of land and property was regulated in writing, along with taxes to be paid. The number of scribes in royal duty increased steadily. To act became more and more synonymous with the act of writing. A written decision was not just a documentation of a decision – the written form *made* it a decision. In fact, several languages use the same word for actions and written files – *acta* in Latin, *Akten* in German, *acts* in English.

There is always a risk that administration becomes a goal in itself. In Clanchy's words: "Making lists was in danger of becoming a substitute for action." In many cases, however, writing mainly replaced previous methods of communicating. Actions such as the transfer of power or possessions, assignments, and treaties had often been carried out in ceremonial ways that involved dubbing with swords or offering symbolic gifts. These rituals became less common when writing took over the symbolic and legal functions, though some of them are still performed. Most weddings involve an exchange of rings, even if it is signatures on a pre-printed form that make marriage binding in a legal sense.

While paper had become a common writing material in the Middle East, a great variety of materials were used in Europe. Birch bark was used as a writing material in some parts of northeastern Europe, while papyrus dominated in the south. Wood was also used, sometimes covered by a layer of wax in which notes were inscribed. If the wax surface was smoothed out it could be reused again and again. In Scandinavia, runes were carved in bones, stone, or metal. Parchment was widely used in other regions, England among them. Calf skins were considered the best, but sheep skins were more common. Skins from rabbits and squirrels could be used as well. The tools needed to produce written texts show that it was a true craft. A skin was cleaned with a knife or a razor, and rubbing it with a piece of pumice made it smooth. A tooth from a wild boar or goat was used to polish it and make the surface hard. Texts were written with quills made sharp by knives. Ink, kept in an inkhorn, was made from minerals or bark.

Many images from the Middle Ages that depict clerical scribes copying and illuminating religious manuscripts in the *scriptoria* – the rooms dedicated to writing in monasteries – are not representative of medieval writing practices in general or writing within the expanding system of state administration in particular. While clerical scribes copied manuscripts, administrative scribes usually transcribed dictation or oral communication in courts. What made it possible to increase administrative writing capacities was not technical inventions,

Pictured here are the tools of writing: paper, quills, ink, a scraping knife, red wax, and a seal. The portrait of an unknown Olivetan monk (a branch of the Benedictines) was painted around 1500 by an unidentified artist. Metropolitan Museum of Art, New York.



but new routines and practices. A first draft was often made on wax tablets and later transferred and rewritten on parchment. Handwriting styles changed over time and differed between regions, but most religious scripture from Western Europe was written in an upright style where every letter was separate, a style called *textura*, blackletter, or Gothic script – a style later remediated in early printing. It was a time-consuming style, however, and not suited for clerks within administrative institutions taking dictation and working under time-pressure. The cursive style they developed, where the letters of a word are joined in a continuous flow, was much faster. Other methods to increase writing speed included standardized wordings and templates. Most administrative texts were not bound as codex volumes but were sewn together and kept as scrolls.

The collections of books and scrolls grew steadily during the Middle Ages. Yet, the collections of Christian Europe could not match those of the Muslim world. Sorbonne had the most prominent library of Christian medieval Europe, with over 2,000 books in 1338. Canterbury cathedral had a collection of about 1,300 volumes in the early

fourteenth century. More impressive is perhaps the cathedral in the small Swedish town of Skara – where a few of the local bishops were educated in Paris – which possessed about 500 volumes in the late Middle Ages. Still, these libraries were small compared with collections in Islamic centres. The library of Córdoba – Muslim until 1236 – had a collection of about 44,000 volumes already in the tenth century. A staff of 500 people is said to have worked in the library. The catalogue alone required forty-four volumes. Mere numbers, however, do not say much about the actual size. The idea that books and volumes represent separate and cohesive units is a result of the standardization of texts brought about by printing. Before printing, it was up to individual collectors to decide which texts to bind or sew together. A volume could contain several different texts, or a single manuscript could be split up into multiple volumes.

Access to written texts in the Middle Ages may seem limited. Nonetheless, some readers in thirteenth- and fourteenth-century Europe had a hard time navigating the perceived information overload. An indication of this is the extensive production of compilations – *summa* or *florilegia* in Latin – of useful text passages from works in various areas. Students and other readers who needed information on specific topics but lacked the ability to locate and access all the relevant sources, would find commented snippets of them in these compilations. A *summa* on the subject of law introduced itself like this: “To many who are in a hurry and many who are unlearned, a compendium in a brief volume of the justices’ judgements may be very necessary, so that an inquirer does not have to turn over a mass of books and chapters, when he will find what he is looking for without trouble, brought together here in a brief space.”

The experience of overload is always relative to the capacity of the methods for storing, sorting, selecting, and summarizing information. In the fourteenth century, a flow of translations of antique works and Arabic science from the Iberian Peninsula and the Middle East contributed to the notion that there was simply too much to read. This influx of texts and ideas created a renaissance for Greek and Roman culture and came to influence science as well as art, literature, and architecture. Educated Europeans could now update themselves on the scientific discoveries of the so-called golden age of the Arabic world. With all the new manuscripts that were suddenly available, tools were required to filter and find what was useful. Readers in a hurry, with a mass of books to search through, needed something to guide them. A *summa* served as such a guide. Other tools that were developed and



The chaining of books was the most effective security system in European libraries from the Middle Ages to the nineteenth century, indicating the high value placed on books. The Chained Library at Hereford Cathedral, England, dates back to the seventeenth century, and is still open to visitors. That the library has been a tourist attraction for so long is evident from the stereo image taken by W. Harding Warner in the 1860s. Unlike on bookshelves today, the spines of chained books faced away from the user. This allowed the books to be removed and opened without turning them around and tangling the chains. The J. Paul Getty Museum, Los Angeles.

widely used during this period were the table of contents, subheadings, indices of names and topics, bibliographies, and notebooks.

The learned culture of the Renaissance was mainly upheld by the elites, and thus had a limited impact on the daily lives of most Europeans. If they encountered writing at all, it was most likely in the form of religious scripture and documents of a practical or administrative nature. Michael T. Clanchy highlights an interesting paradox: literacy was more widespread in the regions *least* affected by the Renaissance movement. Iceland is one example (judging by the number of vernacular manuscripts). It was located far from the educational centres of continental Europe and had no towns at all. Very few people could read fluently in the late Middle Ages; the ability to write was even rarer. Still, the capacity to recognize and decipher a few words and phrases was not uncommon. The spread of this limited literacy had little to

do with Renaissance culture. Rather, what forced people to read was the need to be acquainted with administrative documents, contracts, court decisions, written regulations, and similar texts. Clanchy concludes: “Practical business was the foundation of this new literacy.”



## Medieval Intermedia

Text was not always the primary communication medium in the contexts where written documents circulated. Those who wanted to reach out needed an ensemble of different media, texts as well as sound and visual media. One illuminating example of such media use comes from Buddhism. This was one of the first religious movements to use print in a systematic way. Printing developed in China to decorate fabrics, but from the seventh century and onwards it was used to reproduce texts. To copy sacred scripture was by then already an important part of Buddhist practice, the more copies the better. Printing made it possible to reproduce texts more quickly. In the mid-700s, as many as one million copies of a prayer to stop smallpox were printed in Japan. Yet, the main intention was not to spread the texts in order to recruit new followers. Reproduction was the goal in itself. When the prayers to stop smallpox were printed, they had to be kept in a temple to do their work. Prayer wheels and prayer flags followed the same logic: their main function was to distribute prayers; they were not meant to be read in a traditional sense.

However, confronted with other religions, Buddhists were forced to change their media strategies. In Central Asia, where roads and cultures met, several religions tried to attract new souls. Buddhism had to compete with Judaism, Christianity, Islam, and Zoroastrianism for space and visibility. One reason to build spectacular temples was to be seen. Ceremonies and songs were also developed to make followers heard among the religious noise. Traditionally, Buddhism emphasized the path to wisdom and liberation as an individual spiritual journey. From the perspective of strategic communication, however, such journeys were too quiet and too invisible. Temples and statues were raised to make Buddhism more visible, especially along roads where many people passed by. When visiting the temples, followers were advised to hire musicians to “beat drums, blow horns and conches, pan-pipes and flutes, play lutes and harps, gongs, guitars and cymbals.” Updated media strategies were needed to make the religion seen and heard.



Scripture is the foundation of many religions, but a range of other media has been used to spread the message: songs, bells, gongs, and drums. In the Old Testament, God commands Moses to make two silver trumpets: “Use them for calling the community together and for having the camps set out.” Bells have a special place within Christianity. Within Islam, believers are called to prayers from the minaret. In places where churches and mosques were located close to each other, such as the Middle East and the Iberian Peninsula, different technologies were used to drown the enemies’ call to prayers. Muslims in ninth-century Córdoba thought that the Christian bells jarred on their ears, while Christians were upset about the blasphemous cries from the minarets five times a day.

The church bells of medieval and early modern Europe signalled the rhythms of prayer and the passage of time. Bells rang out when it was time for worship, when someone had died, during baptism, at the beginning and end of the workday, in case of danger or big news, and whenever people needed to gather. Strikes and rhythms varied depending on the message. If a fire broke out, specific bell strikes could inform citizens about its location. The sound of the bells broadcast events and information – and showed who controlled and dominated the soundscape. Ringing bells were manifestations of religious and political power, and insurgents and conquerors would often try to take control of the bell towers. Still, the local congregation could also be invited to contribute to the media production. When metal was needed for a new church bell, locals who had the means sacrificed candlesticks and coins.

Inside churches, visitors encountered sculptures, paintings, and decorations. When Christians abandoned their skepticism towards imagery, they started to use walls and ceilings as surfaces where faith was communicated visually. Images were to serve memory, inspire religious awakening, and aid in teaching. In a world with few images, visually rich churches were sure to make an impression. The inscriptions and speech scrolls framing and explaining the church paintings made spectators familiar with phrases in Latin. In the same manner as the ancient tradition of painted ceramics, medieval church paintings are often sequential. Some of them can be read as cartoon strips with speech scrolls having the same function as speech balloons. Paintings, together with fabrics, sculptures, mosaics, preaching, and songs, made church service into a kind of multimedia show. Travelling painters spread styles and themes from church to church. Depicted in

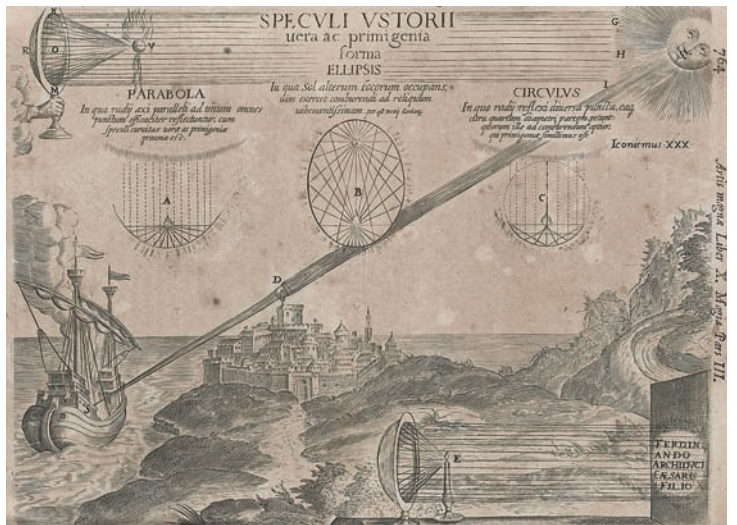
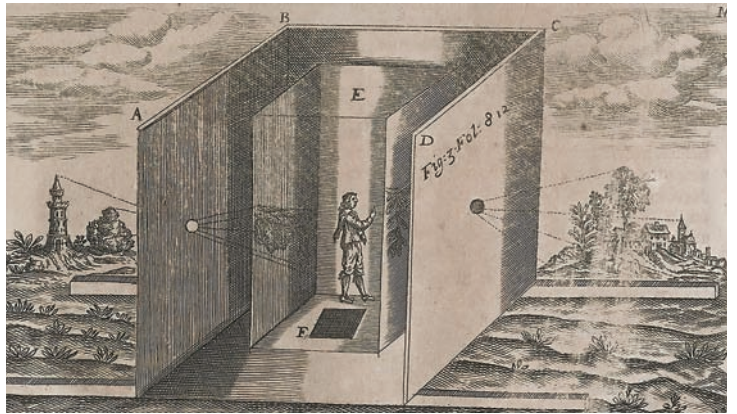
clothes that people would recognize from their own lives, biblical characters and saints became figures to identify with. When illuminated books were used as models, church paintings could also introduce fashion from royal courts and cultural centres.

Dreams of a painting so realistic it seems to erase its own surface, making image indistinguishable from reality, have existed at least since ancient times. An anecdote recalled by Pliny the Elder, about a competition between the painters Zeuxis and Parrhasius, is often used to illustrate such ambitions: “Zeuxis ... produced a picture of grapes so successfully represented that birds flew up to the stage-buildings; whereupon Parrhasius himself produced such a realistic picture of a curtain that Zeuxis, proud of the verdict of the birds, requested that the curtain should now be drawn and the picture displayed; and when he realized his mistake, with a modesty that did him honour he yielded up the prize, saying that whereas he had deceived birds Parrhasius had deceived him, an artist.”

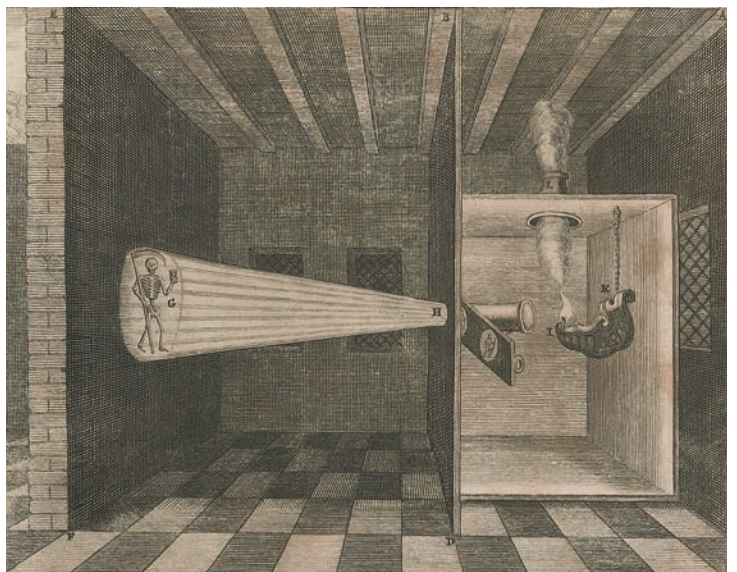
How different visual styles and techniques were experienced by contemporary spectators is difficult to know, but from the medieval paintings themselves we can conclude that the perspectives they reproduced were hardly an individual observer’s point of view. The size and placement of depicted humans, animals, objects, and buildings were determined by hierarchies of importance and symbolism – rather than their distance to an observer standing in front of an image. It is thus hard for a spectator to make the same mistake as Zeuxis, confusing image and reality, when he or she is confronted with a medieval church painting. This would change with new visual techniques developed during the Renaissance. The linear perspective meant that objects were depicted according to their distance from a viewer. Objects close to the viewer were made larger, distant ones smaller. Parallel lines converging in a vanishing point, corresponding to the intended position of the observer, made a flat surface seem three-dimensional.

One theory is that Renaissance painters took inspiration from the camera obscura when they experimented with the linear perspective. This optical construction, described in theory by Aristotle, was first built by the Arabs and became known in Europe in the thirteenth century. A camera obscura functions as a large-scale camera, with a dark room, a small hole in one of the walls, and a light source on the other side of the wall. When light enters through the hole, an upside-down image will appear on the opposite wall. The image projects the outside scenery depending on its distance and angle to the hole.





The *camera obscura* and *laterna magica* were among the visual techniques described by German Jesuit scholar and media visionary Athanasius Kircher in his *Ars magna lucis et umbrae* (1645–46). In his writings Kircher discussed methods for projecting, scattering, and directing light with mirrors and lenses. Kircher is a good example of a writer who borrowed freely from the works of previous authors. The principles of how a *camera obscura* works had already been described in antiquity. Athanasius Kircher, *Ars magna lucis et umbrae* (1645–46).





*Annunciation Triptych.* The Annunciation – when the angel Gabriel announces to the Virgin Mary that she will give birth to a son – is one of the most recognizable scenes in Western Christianity. Mary is usually depicted with a book, but what was she reading? It was almost certainly a prayer book, and scholars have argued that the reading Mary represents a sophisticated model of reading, foundational for devotional practices, especially for female readers. This triptych from circa 1430 is cast as a household event, a domestic painting to reflect upon in private prayer, from the Netherlandish workshop of Robert Campin. Metropolitan Museum of Art, New York.

Several Renaissance painters used the camera obscura as part of their artistic process – others may have developed the linear perspective independent of this technology. Nevertheless, the result of the new visual technique was that the viewpoint of the individual onlooker became the standard perspective for how the world was visually represented. We see similar developments in other parts of Renaissance culture – human perspectives became the measure of all things. When Giovanni Pico della Mirandola gave the word to the creator in his famous *Oration on the Dignity of Man*, composed in the late fifteenth century, it was to emphasize the human location and condition: “I have placed thee at the centre of the world, that from there thou mayest more conveniently look around and see whatsoever is in the world.” Renaissance paintings made such a spectatorship possible. Rather than God’s view – observing everything independent of angles and distances – paintings based on the linear perspective reproduced human views. The visual style of the Renaissance put European

observers at the centre of the world. The basic geometrical principles now guiding visual representations – making it possible to calculate the distance between two points based on the angle to a light source – were also foundational to the new navigational technologies that made European voyagers dominant on the oceans.

## The Inca Empire Solves a Knotty Problem



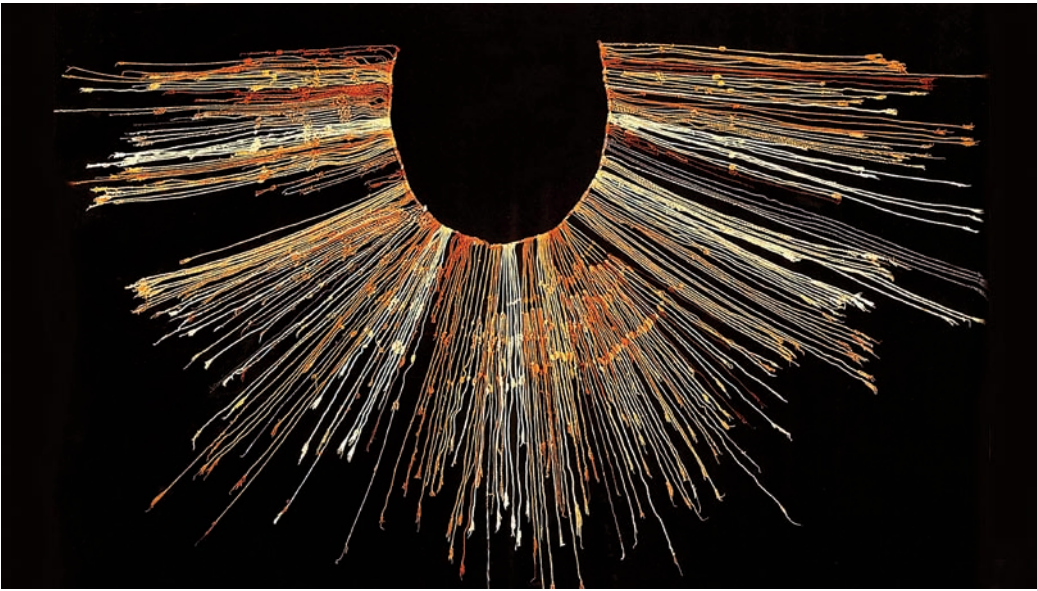
It was the relatively fringe position of Western Europe that in 1492 prompted Christopher Columbus to sail west, looking for shorter routes to the mighty Chinese empire and to India. When he instead made landfall in the Bahamas, and Vasco da Gama rounded the Horn of Africa on his way to India a few years later, the centre of the world's developing communication networks was shifted west. Now the cities and ports of Western Europe became central hubs for global communications. One consequence of Western European expansion across the sea was that several other civilizations – and their communication networks – collapsed.

The greatest of the empires to be erased was the Inca Empire in South America, which was established sometime during the thirteenth century and reached the peak of its power in the sixteenth century – just before it fell victim to the Spanish conquistadors. The remnants of the Inca culture include traces of one of the most advanced media for storing and transmitting information that is not based on writing: the “talking” knots, known as *kipu*.

The talking knots were a specific solution to a communication problem that everyone in power must wrestle with: how can the empire be governed, the territory controlled, and the subjects monitored? As well as maintaining a military presence in various parts of the Inca Empire, the central seat of power developed the knots as a governance and surveillance technology that made it possible to command and register people and their property from a distance. The *kipu* system has no equivalent to the Rosetta Stone – which enabled hieroglyphs to be deciphered in the nineteenth century with the help of a parallel text in Greek. The meaning behind some of the knots has, however, been unravelled.

The majority of the *kipu* examples found comprise a horizontal and slightly thicker thread, to which other threads are tied so they hang vertically. These hanging threads may, in turn, have other threads tied to them, and this can continue further. The different branches





*Khipu*, the knots that once held the Inca Empire together, today represent a dead medium. Yet the characteristics associated with this medium remain highly vivid. Registering, sorting, and summarizing, being an aid to memory, and making the absent present are basic functions that still characterize media usage. This particular khipu is from the fifteenth or sixteenth century. Museo Arqueológico Rafael Larco Herrera de Lima, Peru.

create different levels within the network of threads. The hierarchical social structures of the Inca Empire are thus reproduced in the medium used to maintain it. The threads can have different colours, and almost all of them carry knots of various kinds. Most of the knots represent numbers between 1 and 10, plus 100, 1,000, and 10,000. Other knots can represent places, people, and objects, but only a few of these knots have so far been deciphered. As a communication form khipu was not based on signs tied to sounds (like the letters of the alphabet). Hence, there were no obstacles for communication between the many different language groups within the empire. As in all other languages and information systems, the meaning of the individual sign – in this case a knot – depends on its context: Where on the thread is the knot located and what other knots are in the vicinity? What colour is the thread and what thread is it connected to? As the wide use of numbers suggests, khipu were basically a medium for bookkeeping, and few people apart from bookkeepers were able to “read” these knotted records.

The Inca Empire was governed from the capital Cusco in modern-day Peru; it was divided into regions and villages, classes, families, and households. At different levels within the administration, bookkeepers were tasked with noting down and collating – knotting together – the information to be sent up and down the hierarchy. The majority of subjects were forced to carry out a certain number of days of work each month in the service of the state, and the knots were used primarily to administer this work – as well as the fruits of the labour.

Orders were dispatched from the central administration stating what work had to be carried out, including how many subjects were required to report for duty. Regular censuses recorded the gender and age of everyone in each household. Other arrangements of threads registered how many days of work each person had completed. Taxes were accounted for in the same way, as were supplies of food and other property in the state depots. Copies and summaries were sent by courier between regional centres and the capital. To monitor and follow up on changes and decisions, the records were stored in archives across the empire.

Since the *kipu* technology was vital in holding the empire together, it is hardly surprising that the Spanish conquistadors burned as many as they found. The old means of governing were thus replaced with new ones: swords, bibles, and paper documents. Of the cargo that the Spanish brought with them across the Atlantic, the Inca people were tragically most receptive to the one that would prove most lethal. Large swaths of the population died of smallpox during the sixteenth century alone.

## Early Modern Oral, Written, and Visual Continuity



According to the seventeenth-century English philosopher Francis Bacon, gunpowder, the compass, and the art of printing changed the world. With superior war, navigation, and information technology, European colonization gained momentum. It began in the fifteenth century and encompassed most of the globe by the nineteenth century. *The early modern period* usually refers to the era after the Middle Ages and up to and including the French Revolution, that is, from the mid- or late fifteenth century to circa 1800. The geographical starting point for this time division is Europe – since the continent became the centre from which global changes originated.



The pulpit – the raised stand for preachers in a Christian church – was a mass medium. Among Christian populations worldwide, the pulpit has retained its significance. This picture shows a scene from Ingmar Bergman’s *Winter Light* (1963). The church interiors for the film were first shot in Skattunge Church in mid-Sweden, with a pulpit from 1696. Yet, Bergman considered the scene too beautiful – and complained to the cinematographer Sven Nykvist: “All this brilliance! This charming light, don’t you think it’s wrong, Sven?” The scenes had to be filmed anew, this time in a reconstructed church at the Swedish Film Industry (SF) studio in Råsunda near Stockholm, which this still from SF accordingly depicts. Swedish Film Industry, Stockholm.

It is often said that the new printing techniques that emerged around the middle of the fifteenth century changed the earlier oral culture of Europe. That is an exaggeration. Above all, the take-off point is wrong. The preceding culture was, as has been discussed, not only, or even primarily, oral. It was also material, written, and visual. Visual art, filled with symbols and allegorical messages, did not disappear. Churches, for example, were decorated with altarpieces, epitaphs (memorial plaques), stained glass windows, tombs, coats of arms, and crucifixes, and these continued to reach the many who attended church services. The architecture of power – the secular as well as the ecclesiastical – could be seen by all.

There is good reason to linger at the church. Sweden, where a fairly effective information system was established, is an interesting

case in point. The pulpit – the elevated place from which the priest spoke – can be described as an oral mass medium. From the Reformation onwards, increasing emphasis was placed on the preaching of the priest; already in the sixteenth century a sermon would often be about an hour long. Through the pulpit, both secular and religious authorities reached more or less the entire population. In this way, injunctions and ordinances, taxes and levies were announced. The population was kept in check, as well as the state's own officials. From the pulpit, people were informed about the world and made aware of their rights. The pulpit conveyed news about, for example, appointments and deaths, war and peace. This is one explanation for why early newspapers were relatively poor at sharing domestic news: much was already known.

What is true of the pulpit can also be said of newspapers – and later radio and television – when they are assigned the role of creator of so-called imagined communities. The spatially separated but simultaneous consumption of the same message in the same medium created a sense of collective belonging. The common and shared media consumption formed a sense of an “us.” In terms of simultaneity, and geographical and social reach, the early newspaper literature also fell short in comparison with the pulpits – from these the messages came reliably at the same time, every Sunday, in every parish. Importantly, due to the ordinance on church duty, attendance was mandatory.

Other parallels with newspapers can also be cited. The pulpit could also function as an advertising medium for such things as livestock and movables, lost objects and auctions. One difference from the newspapers and other printed announcements was that this oral form of advertising was free of charge. However, such oral communication did not diminish with the significant growth of newspapers from the middle of the eighteenth century. On the contrary. Proclamation of official decisions from Swedish pulpits was first required in the Church Act of 1686 and (except for a short period around 1700) abolished as late as 1894 – yet the practice was not abandoned until 1942. And every parish's obligation to provide the Constitution didn't cease until the mid-1970s.

Alongside the church, the European university system had been gradually expanding during the Middle Ages, starting with those in Bologna (1088), Paris (ca 1150), and Oxford (1167) and spreading slowly across Europe. When the first Nordic university was founded in 1477 in Uppsala, closely followed by Copenhagen in 1479, the total number of universities in Europe was close to thirty. Around 1800, they had



increased fivefold, numbering almost 150. But even in the academic world, printing technology did not take over. University teaching was (and still is) largely oral. The same was true of dissertations, which put great emphasis on the rhetoric of the defence. Nor were the songs and ballads in the streets and taverns silenced because of the art of printing. Sometimes they functioned as a news medium, but more often it was about “entertainment,” often moral stories but also other things, from obscenities to politics. Homeric memory techniques with standing elements were still used, and the performances were probably partly improvised. Of course, there is also no reason to believe that rumours and gossip – an astonishingly fast but historically difficult form of communication to study – would have diminished just because of printing technology. One might just as well assume the opposite.

Nor did the spoken word merely survive in a new kind of culture dominated by print. New forms of oral communication arose and developed. The sermon in the vernacular in Protestantism belongs here, as does the psalm, where the congregation actively participated in the service, in contrast to the passive partaking of the sermon in Latin. Martin Luther, who helped to instigate the Protestant Reformation in the early sixteenth century, wrote hymns, some of which are still sung today. In the new stock exchange houses, the business of trade was largely based on oral exchange. Academies and learned societies – all more or less new phenomena – were for the most part places for oral communication.

Conversation was thus highly valued. The art of conversation was cultivated and refined and was itself a topic for discussion, in both oral and written form. Manuals appeared during the sixteenth century. So-called conversational lexicons came in the eighteenth century, a century that has been characterized as “the sociable.” In the trading city of Norrköping, Sweden, in the latter half of the eighteenth century, the Gossip Square was renamed the Conversation Square, and in 1793 it was decided that its more enlightened citizens would meet every day to converse.

The printing press was introduced into a culture that for some time had seen a swelling number of handwritten documents in the government, the church, and the economy. This growth can be described as a more impersonal form of the exercise of power – where decisions were formulated and documented in writing based on formal rules – that began to take over in more and more areas. Power was exercised, the law was applied, and business was carried out increasingly through paperwork, that is, through bureaucracy – sometimes over very large

geographical areas. Already in his day Philip II of Spain (r. 1556–98) was called the paper king, *el rey papelero*.

The reach and scope of these paper-based control systems can be exemplified by Real Casa de la Contratación de Indias, located in Seville. Established in 1503, only eleven years after Christopher Columbus first crossed the Atlantic Ocean, it was meant to control migration and tax trade with the new territories. The Spanish Crown wanted to prohibit beggars, criminals, married men (leaving wives and children behind), and persons of Jewish and Moorish origin from migrating to America. The bureaucratic machinery of Casa de la Contratación served as a bottleneck where only legitimate travellers were allowed to pass through. First, a royal licence was needed by anyone who wanted to migrate. Second, the one granted a licence had to prove his identity in his hometown and prove that he lived an ordered life, often by calling witnesses. Since Philip II suspected that many unwanted travellers slipped through, extra precaution was called for. The local mayor had to certify in writing the identity and truthfulness of the witnesses. This certificate was in turn certified by a royal scribe, making sure that the mayor was indeed the true mayor. A second scribe had to certify the identity of the first scribe. With the papers properly signed, the traveller could finally head to the Casa de la Contratación and present his case in front of a judge. What the Spanish bureaucracy established was that only the written documents could prove one's identity, making them an important part of the pre-history of the passport.

Not everyone who travelled across the Atlantic was a free citizen. After the annexation of Portugal in 1580, the Spanish Crown had – in theory at least – a monopoly that controlled and taxed all sales of slaves destined for America. The slave trade was a bureaucratic business, overseen by the very same Casa de la Contratación. To become legitimate slave traders, individuals or companies bought a licence specifying how many slaves to deliver, the ratio between males and females, and how many extra to carry to make up for the expected mortality during the journey. In many cases, a portion of the slaves were to be sold directly for the benefit of the Crown. Every ship needed a scribe for the bookkeeping, and the owner of a licence was required to keep agents on the African coast, in American ports, and in Seville to register and report the number of slaves who were shipped and delivered. From the perspective of the enslaved, the journey went from Africa to America. The bureaucratic journey, however, both began and ended in Seville. That is where the months-long process of getting a licence started, and where records, taxes, and revenues were sent.



OPPOSITE | In the late 1730s, the French draughtsman, archaeologist, and art collector Anne Claude Philippe de Tubières, comte de Caylus, began publishing a collection of etchings entitled *Études prises dans le bas peuple où les cris de Paris* (1737–42) – graphic studies of working-class professions and “the proclaimers in Paris” – that is, sellers who advertised their goods with enticements. The series of etchings is also known as The Cries of Paris. Among those depicted in de Caylus’s sketches were professional groups such as florists, fish, ink, and hat sellers, and broom peddlers, as well as several who had a media-related trade: picture salesmen, poster makers (*L’Afficheur*), laterna magica presenters, and organ grinders. The fact that de Caylus portrayed such media-related professions, with both men and women performing them, suggests a media-saturated society. It is also noteworthy that de Caylus took the opportunity to advertise his own publication in two of his etchings (with posters). Metropolitan Museum of Art, New York.

In the broader population, too, one can see how writing took up more space through, for example, petitions with signatures and political graffiti. The fact that writing became increasingly important can also be seen from the various writing and reading services that emerged at the beginning of the early modern period. For a fee, professional writers and readers offered to interpret the illiterate’s letter and formulate an answer – that is, a form of mediated literacy. In so-called family albums or friendship books – *Stammbücher* in German – family and friends wrote to and drew greetings for each other, relations and friendships that over time were nurtured through letters and entrusted to diaries.

## Multimedia Festivals and Everyday Life



On 5 February 1701, Sweden celebrated the victory at Narva (in present-day Estonia). A few months earlier King Charles XII had defeated a Russian force three times its size in an early battle in the Great Northern War. The day had begun with thanksgiving (*Te Deum*) in the churches around the country, including a long and detailed account of the young – he was then eighteen years old – king’s victory over the tsar, read aloud by the priest. When the congregation in the Great Church in Stockholm sang “We praise Thee, O God,” the cannons were fired outside and soon were joined by another 130 deafening pieces around the city. At six o’clock in the evening, more than one hundred people were needed to light the 2,500 oil lamps that illuminated a 25-metre-high and 15-metre-wide Pyramid of Honour. Its nineteen



steps carried metre-high illuminated messages in Latin, and a printed text explained everything in both Swedish and German. Some wealthy citizens arranged their own illuminations. One of them represented an amphitheatre about fifty metres wide, with the king hovering over gods and personifications of various virtues. Everyone who owned a property in or near the city of Stockholm had been requested to light candles in their windows – the first urging had been sent out before Christmas. Music was played in the specially lit churches. It was crowded with people on the normally dark streets, which reinforced the extraordinariness.

This type of multimedia ritual, marketed and staged in advance and reproduced in texts and images afterwards, was characteristic of the era. Communication went in all directions: upwards (to the royal house and, of course, to God), downwards (to the people), across (a giant amphitheatre says something to neighbours and competitors about who you want to be known as) and outwards (to foreign diplomats on site, but also to everyone within hearing and sight from Stockholm). Various types of events also took place in other parts of the country, and the number of printed texts – speeches, sermons, and songs – was considerable.

The Narva celebrations in 1701 stood out by Swedish standards. Usually, the thanksgiving service was enough. The clergy complained about the superficiality: “thundering shots and illuminations, comedies and ballets, ring-running and tournaments, etc. ... pleases the eye and tickles the mind, but God sees what is inwardly in the heart.” Inspiration for the excesses came from the European continent. Such displays had become commonplace with well-directed and grand processions, and sometimes either temporary or permanently erected triumphal arches – often in connection with coronations – as well as staged historical battles, a kind of re-enactment *avant la lettre*. Such media phenomena were picked up from the Roman tradition. In the Narva case, the references were explicit: like “the populace in Rome,” Stockholmers were drawn into the event and played an active role.

This kind of extraordinary and magnificent multimedia arrangement demonstrated the technical possibilities of the day, but also suggests what was happening on a smaller scale and on a daily basis. Images of Luther (and other notables) often contained an explanatory text (if only a name), and Luther’s hymns were printed and circulated. Handwritten or printed texts were read aloud from the pulpit, and the paintings on church walls often contained both image and text in the form of speech bubbles and explanatory captions.

As we have seen, combining different media modalities (image, sound, text) is communicatively efficient – so there is nothing new here. Since its conception in antiquity rhetoric has consisted of speech and gestures and is thus audiovisual. Public executions were mainly visual but were framed both orally and in text. Cursing and stone throwing can be seen as an interactive element in the same way that contemporary theatre audiences often interacted loudly with the actors on stage.

Plays have a long history and have taken different forms. During the early modern period, they appeared mainly on occasions such as festivals and markets, as well as at the courts, and were performed by travelling companies. From the latter part of the sixteenth century, permanent public theatres with employed actors were also established. At the beginning, this took place in large cities with a sufficiently large audience base such as London, Madrid, and Paris. In London, around 1600, individual artists – playwrights such as William Shakespeare and Christopher “Kit” Marlowe and actors such as tragedy specialist Richard Burbage and comedy actor Will Kemp – had what is best described as star status in a stacked market with several competing theatres. The first opera house opened in Venice in 1637.

On a different scale, these developments were copied in the European cultural peripheries. In the mid-1600s, the Bear Fold Theatre (long used for exhibitions of animal incitement) and the Lion’s Den (originally built for a lion war booty, a popular attraction and symbol of war victories) were two early theatre venues in Stockholm. From the 1660s, theatrical plays were also performed here in the Great Ball House, built in 1627 for *jeu de paume* (or real or court tennis), offering another kind of performance, namely that of the royal court. The game was the origin of what since the late 1800s is called (lawn) tennis, initially a stage for the upper class and now an arena for the middle classes. The ball houses, with their grand courts and spectator galleries, became common venues around Europe for travelling theatre companies. In 1773, both the Royal Opera and the Royal Ballet performed in the Great Ball House. The Drottningholm’s Slottsteater – with a still-functioning machinery for set changes, trapdoors, moving waves, light machinery, and wind and thunder devices – was inaugurated in 1766.

In a figurative sense, too, the stage is a useful metaphor for the period. The prime example is Louis XIV, analyzed by Peter Burke in *The Fabrication of Louis XIV* (1992). During his reign from 1660 to 1715, a public image of the French king was staged for national and

international audiences, as well as for posterity, using all available media: newspapers, chronicles, poems, plays, ballets, operas, paintings, etchings, medals, architecture, illuminations, statues, and triumphal arches. Even the king's dressing and undressing, as well as his meals, were carefully directed performances. This is how the Sun King, a ruler of Olympian proportions, was created for posterity and how his power and politics were legitimized – through a series of media forms where the sum exceeded what was staged in each individual medium.

Today, it is common to say that the media are permeating more and more areas of society. The so-called mediatization of politics, for example, is usually traced to the age of radio and especially of television, and is assumed to accelerate, even explode, with the development of the digital realm. But as has been suggested, the phenomenon itself is not actually new. The Narva celebration in 1701 was a multimedia event, and politics during the reign of Louis XIV was completely intertwined in the media landscape of the time – these were media societies. There is, of course, a difference between tweeting and being portrayed in oil on canvas, but it is one of style and form. Instead of assuming the uniqueness of our own time, we should acknowledge the diversity of media dependencies, crossovers, and links in the past.

No one could fully control this diversified media supply. And it was used not only to preserve and maintain certain systems but also to change them. The German Reformation had a long prehistory, but it should also be seen, as suggested by Asa Briggs and Peter Burke, as a “media offensive” on a broad front, partly governed and dictated, partly uncontrollable. Luther not only had his famous ninety-five theses on the sale of indulgences in Latin printed in 1517 and his translation of the New Testament into German: to his prints, drawings, and hymns must be added his cheap and well-distributed pamphlets, catechisms, lectures, and public burning of the papal bull he received in 1520, as well as the gossip that this media offensive triggered, including rituals and street theatre staged to ridicule the Catholic Church. None of the Protestant reformers worked through only one medium.

The French Revolution offers another example of a multimedia phenomenon, one that demonstrates the power of circulation and popular engagement to shape and gradually consolidate the content of the media. Stories in pre-revolutionary France about political events and institutions – often including elements of scandals of a sexual nature – took shape in a complex, dialogical web. Through handwritten messages, songs, oral gossip, and printed texts, messages circula-



*Ace of Spades*. Blackletter or Gothic script was used throughout Western Europe from the Middle Ages until the 1940s in German-speaking countries – and later by, among others, heavy metal bands. The LP *Ace of Spades* was released in 1980 by **motorhead**. The band's name was usually printed in a lowercase form of blackletter. Wikimedia Commons.



ted back and forth, up and down through society's hierarchies, until they gradually took firmer form and became established truths. This is reminiscent of the so-called collective intelligence that is today associated with the internet. This complex participatory culture in a broad media spectrum had a decisive influence on attitudes toward, for example, the legitimacy of the monarchy and helped to trigger the French Revolution in 1789. The idea of Twitter revolutions today is a simplification of much more complicated processes with a long history. Early modern life was far from being monomedial.

## A Partially New Printing Technology



Naturally, the printing press played a role in these multimedia events – the question is just what that role was. While the printing press is usually said to have been invented in Europe in the mid-fifteenth century, it was actually a new combination and refinement of old technologies. As we know, the Babylonians had stamped symbols onto clay, and Rome had made use of wax seals, for example. From the third century China developed the technique of printing from inked

wooden blocks onto both fabric and paper, a sort of woodcut technique. Japan was also an early adopter of print technology. The origin of paper manufacture – using cloth or wood fibre – can be traced back to China and the third century BC, at the latest. The oldest surviving and dated book printed in China is a copy of the Buddhist Diamond Sutra from 868.

Experiments with movable type were also made much earlier in Asia than in Europe, perhaps around the year 1000. However, the large number of Chinese characters made the procedure unmanageable. In Korea printers used metal types of a kind like those that began to be employed two centuries later in Europe. The routes of development and arrival times varied, and both tend to be shrouded in obscurity. There are surviving European woodblock prints on fabric from the twelfth century and block books printed on paper from the first half of the fifteenth century. At the time, this was not a cheap material, but it was less expensive than parchment and likely came to Europe in the eleventh century via the Iberian Peninsula and Islamic culture.

The modern European printing press thus built on existing techniques and emerged within an already literary culture and infrastructure. Printed books were an established medium and handwritten manuscripts were becoming increasingly common – all made possible by large numbers of paper manufacturers, scribes, illustrators, and bookbinders. Compared with copying by hand and older printing methods, the technique of movable type that was established in Europe from the mid-fifteenth century meant shorter production times and lower costs. This in turn enabled larger print runs, with the potential to reach considerable audiences. The broader distribution had not only geographical and social implications, but also an archival and memorial component. The more copies there were, the more likely that an idea or observation would be preserved – so that it could be revisited, developed, and disseminated further.

Johann Gutenberg is usually credited as the great innovator, developing a system of matrix casting to create movable type in metal, even if other printers around the same time had made similar advances. A type is a small block of metal carrying a raised and inverted letter. Sorted into a printer's tray with small compartments (one for the lowercase a, one for the uppercase A, and so forth), the required letters could easily be picked out and arranged in a wooden frame that held the type in place in neat rows and straight columns. The frame was placed in a hand-operated screw press, like the kind used in vineyards to squeeze the juice from grapes – another advancement on the



## The Printing Press as an Agent of Change | ELIZABETH EISENSTEIN

*The Printing Press as an Agent of Change* was published in two volumes in 1979. In it, American historian Elizabeth Eisenstein argues that the new printing technology with movable printing types, which was established in Europe in the fifteenth century, had far-reaching effects. So transformative were they, and yet so underexamined, they amounted to what she called “the unacknowledged revolution.”

The period before the modern art of printing was marked by scarcity and instability of knowledge; the period that followed was characterized by growing wealth and greater stability of knowledge. Eisenstein draws attention mainly to three basic but overlapping functions of the new printing technology: distribution, standardization, and preservation – all on a scale and of a kind never seen before. These features were essential for the Renaissance, the Reformation, and the Scientific Revolution.

In essence, it's about *fixation*. Print fixes and secures tradition; the Renaissance, for example, was about securing the old. Simply put, an intellectual elite was freed from the arduous task of copying, which became mechanized. With a new division of labour, time and energy could be spent on reflection, organization, and awareness of content. Armies of scribes were replaced by armies of attentive readers. The transition from physical compilation to conscious verification spurred intellectual advances in Europe.

The fixation of tradition must be understood in a double sense. Manuscripts were fragile and vulnerable material objects. Now they were guaranteed continued existence through multiplication with a robust technology. The other aspect is mental. If manuscript

compilation was a sequestered and private activity, sometimes even done in secret, printing meant the exact opposite: publicity and the widest possible dissemination. Tradition was, so to speak, fixed in the European consciousness (at least among the intellectual elite). A decisive effect of modern printing, according to Eisenstein, was the emergence of a modern historical consciousness: the past was now placed at a fixed distance. This remoteness should be understood as separation not only in time but also in value. The work of “antiquity” was not only old, but it was also exalted, sacralized – a process that always involves separation and keeping things apart.

Print did not cause this in itself, but it institutionalized the rebirth of antiquity, fixed it, and made it a pan-European affair. And despite its elevation of the classical, the printing process simultaneously laid the foundation for the idea of progress. A sign of this is how the term *original* was reloaded, from denoting primeval to meaning new. For what print really promoted was feedback and creativity. The formerly closed system of compilation was replaced by an open and investigative process. Early results included the innovations of the Reformation and the Scientific Revolution.

Eisenstein's ideas were not entirely novel. They drew from, among others, Marshall McLuhan's *The Gutenberg Galaxy: The Making of Typographic Man* published in 1962. But if McLuhan was associative and aphoristic, Eisenstein cast the historical narrative in a more traditional historical form – at least, according to some. Eisenstein was also criticized by some scholars for being speculative.

OPPOSITE | The frontispiece of *Nova Reperta* (New inventions of modern times) by Johannes Stradanus from the 1590s centred on the printing press, with sheets of prints hanging on a line. *Nova Reperta* catalogued discoveries of the modern world, from the invention of gunpowder to the mechanization of words and image: printing, oil paint, spectacles, copper engravings. The caption of *Impressio librorum*, book printing, stated that the “voice is capable of hearing a lot” by smearing ink on “documents with a thousand pages” (*una scripta mille paginas*). Most of the engravings contained in *Nova Reperta* were done by Philip and Theodor Galle (father and son), and as their images multiplied and spread far and wide, they shaped wealthy Europeans’ perceptions of the innovations that were changing their world.

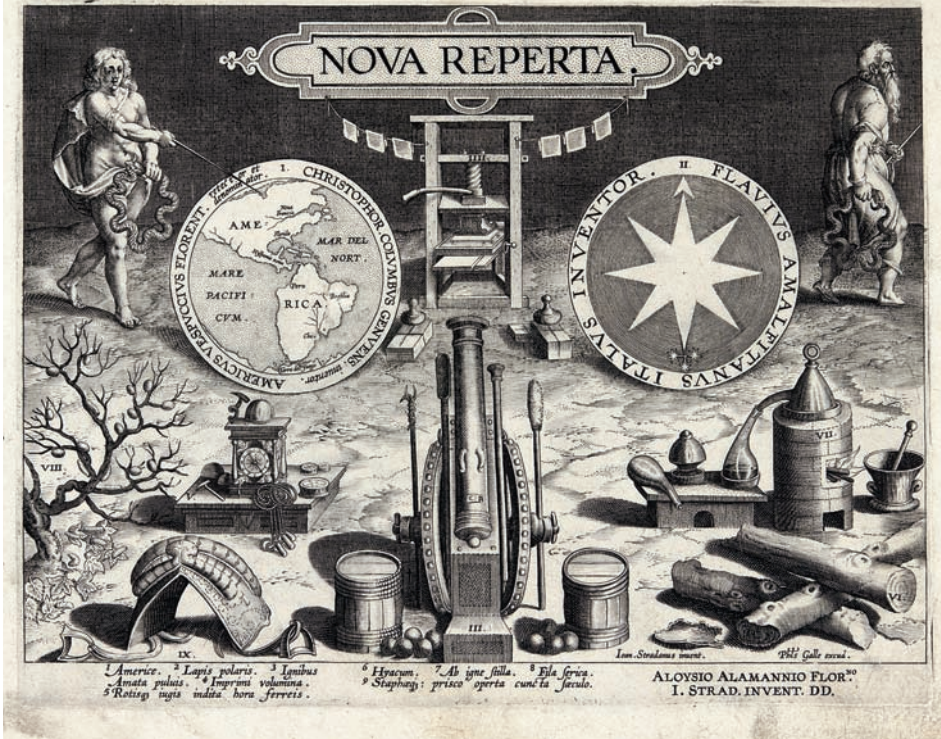
techniques used in Asia – and a sheet of paper was pressed against the inverted and inked type in the frame. If this first print passed inspection, the type was covered with fresh ink and a new sheet of paper was placed in the press. And so on.

One difference between a manuscript and a text printed with movable type is that the former technique is analog, and the latter is discrete, or, to use different terminology, digital. A handwritten A in a stream of text can take on practically any appearance; a printed character in a single text is either an A or it isn’t. The fact that a number of possible variants of a letter may be used depending on what follows, not to mention ligatures – the merging of two or more characters into one, such as Æ instead of AE – in no way changes the system’s digital nature. In this sense, printing with movable type is a digital technology.

As artifacts, however, the printed texts that began to appear in the late fifteenth century did not constitute a distinct new form of media. On the contrary, they intentionally remediated the handwritten manuscript. This situation is typical in media history: new media are made up of old media. Even to the trained eye, it is often difficult to distinguish an accomplished medieval manuscript from an early print. In addition, the books with their usually black text commonly have colourful, hand-painted illustrations, and are thus a kind of hybrid medium, while typefaces and typesetting often mimic handwriting. As stated, printing text and images was nothing new. Block printing could already produce more or less exact copies that could be reproduced ad infinitum (or at least until the relief text and images carved out on the wood block were worn down).

The first major test of the new technology is generally considered to be the Gutenberg Bible (also known as the forty-two-line Bible), probably made in Mainz between 1455 and 1458. Around 180 copies





4. *Potest vt vna vox capi' aures plurimas: Limant ita vna scripta mille paginas.*

are thought to have been printed, a third of which were on parchment and the rest on paper. This might seem quite limited and slow, even for a mighty work in two volumes totalling 1,286 pages. Experts have offered competing guesses on the speed issue – one is that it would previously have taken three years to produce one single equivalent hand-copied book. Gutenberg’s oldest publications, most likely from around the mid-1440s, were much less ambitious products than the Bible. It has even been suggested that, like other works attributed to him, the forty-two-line Bible – sometimes referred to simply as B42 (despite also containing both forty- and forty-one-line pages) – may not have been printed by Gutenberg at all. In fact, very little is certain when it comes to early printing that used the new technology.

This technique of using movable, cast metal type quickly spread across Europe. Printworks were established in city after city, country after country, often through German printers initially. The German-speaking areas dominated, along with the northern part of the Italian peninsula and France (Paris is believed to have had almost 200 printworks in the year 1500, and an estimated 500 printers were active in Venice during the sixteenth century), while Russia and the parts of the European continent belonging to the Ottoman Empire remained unaffected for a long time.

By around 1500, European printworks had spread across 250 different cities, and had together produced over 30,000 works, totalling as many as twenty million copies – for a population of approximately 100 million inhabitants. These early imprints, up until the year 1500, are called *incunabula*, from the Latin for origin, swaddling, or cradle. Choosing 1500 as the cut-off point is arbitrary, and bears no relation to any change in printing technology. The figures are very rough approximations, but in round numbers, over 200 million books were printed in the sixteenth century, over 550 million in the seventeenth century, and close to a billion in the eighteenth century. It is commonly noted that the printing technique barely changed over these centuries. It took until the nineteenth century for the presses to be made of iron (which improved efficiency many times over) and for steam to replace human force for the actual pressing. The 1800s also saw the invention of the rotary printing press as well as the typesetting machine and production techniques for cheap paper.

European developments should also be seen in relation to the Islamic world, where printing was actively discouraged. In 1515, Sultan Selim I threatened anyone who used a printing press with death. Writing was sacred. The pen and calligraphy carried religious weight. It



was taught that the ink of the scholar is as holy as the blood of the martyr. Soulless print bore no comparison. The guild of scribes lobbied to keep printing at bay; they were of high social standing and had a virtual monopoly on manuscript production, so they had no interest in any competition. Arabic science and its dissemination of knowledge from the ancient world provided a crucial foundation and inspiration for the Western Renaissance and the Scientific Revolution. The resistance to the printed word – in the form of an established media monopoly on both religious and financial grounds – now meant that Arabic science became excluded from the new advances. The first press in the Ottoman Empire to print in Arabic is said to have been set up in Istanbul in 1729. In the city of Mosul in Iraq, typographic printing was not introduced until 1861.

However, the geographical distribution of the printing presses doesn't necessarily say much about the linguistic diversity of the texts they produced. The printing centres of Europe printed in many different languages, often for the export market. The Armenian story is an illuminating example. Nothing was printed in what is now Armenia until 1771. The first publication was a collection of prayers, printed at an abbey just outside Yerevan. But the Armenians were keen travellers, settling along the trade routes of Asia and Europe while remaining committed to preserving their language and culture. A diaspora of merchants hence instigated the printing of an Armenian prayer book in Venice in 1512, a magnificent Bible in Amsterdam in 1666–68, and their first newspaper in the Indian city of Madras (now Chennai) in 1794. Religious publications in Armenian were also printed by missionaries who wanted to encourage orthodox Armenians to convert to Catholicism. The publications spread along the trade routes to Armenian communities in the Ottoman Empire, Persia, and India. Although most of the world's early printing presses were established in Europe, their printed material was able to spread far beyond the continent, sometimes in languages that the printers themselves were unable to read.

Otherwise, the global spread of the Gutenberg printing press largely occurred within the framework of European colonization, in the service of administration, trade, and missionary work. Fez in 1516, Mexico City in 1539, Goa in 1556, Manila in 1590, and Cambridge, Massachusetts, in 1638 are some of the earlier locations of printing presses around the world. The arrival of the printing press in Tahiti, Hawaii, and other Pacific islands in the first half of the nineteenth century marked the culmination of what had been an almost 400-year



Albrecht Dürer's woodcut of a rhinoceros from 1515 was widely used in printed works in Europe during the early modern period. As many as 45,000 copies of the image were sold during Dürer's lifetime alone. But he himself had never seen a rhino – and no one else in Europe had either (not since Roman times). Dürer's woodcut was based on written descriptions and a sketch of an Indian rhinoceros given as a gift to King Manuel I of Portugal. National Gallery of Art, Washington, DC.

process of global conquest. Meanwhile, in the Western world the old type of press was beginning to come up against new technologies.



## A Printing Revolution?

The birth of the European art of printing has been described as a revolution, and the new technology is regarded as an agent of change in several revolutionary historical processes. Versions of this story are old and widespread but had their most famous interpreter in the historian Elizabeth Eisenstein. The printing press standardized and preserved knowledge, which in an oral and manuscript-dominated culture is believed to have been more unstable. The increasing availability of this supposedly more stable form of knowledge led to a critique of authorities and older assumptions. From this perspective, the Renaissance, the Reformation, and the Scientific Revolution – and, by extension, the Enlightenment and the development of democracy – were all driven,

caused, or triggered by the printing revolution. The culture that came to prevail is said to have been a print culture.

Others attribute far-reaching psychological consequences for humans to the advent of print technology. It has been observed that print arranged knowledge visually through lists, catalogues, tables, and diagrams, impossible or meaningless to read aloud, which is why sight and not hearing came to dominate human perception and to characterize the production of knowledge.

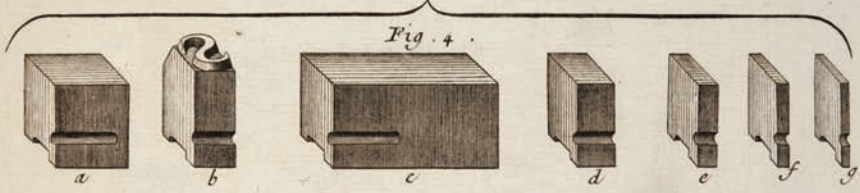
However, a number of objections have been raised against this interpretation. Charts and tables of contents, for example, were not new but existed in ancient manuscripts. And these processes over several centuries can hardly be described as linear but rather as moving in a zigzag and are not best described as revolutions. Changes in the management of knowledge, in terms of production, distribution, and consumption, which indeed occurred in areas such as religion, politics, and science, came gradually, over a long period of time, and with local variations, in interaction with other media and seldom in any absolute terms.

It is possible that the printing presses themselves and the technique of casting type did not change in a radical way for a long time. However, they underwent minor improvements, which could have far-reaching effects. The great press of the Dutchman Willem Blaeu, for example, in the early seventeenth century, enabled map printing of a kind that Gutenberg and his contemporaries had not been able to achieve. Such large and widespread maps would have implications for our ideas about the world. And a printing press depends on the paper and ink that gradually improved and became cheaper.

What is held to be true about the early European printing press rests largely on descriptions from the mid-seventeenth century and especially the eighteenth century. There is hardly any source material during the first 200 years apart from the often very difficult-to-date printed works that are preserved. And they are difficult to interpret. Do we see, for example, a refinement from coarse types to finer ones? Or a simplification of handwriting imitation to a cleaner and more independent printing style? A distinct and continuous print culture, based on an already developed technology that was born in the middle of the fifteenth century, may be assumed rather than proven. Indeed, some historians claim that we know virtually nothing with certainty about the earliest printing and casting techniques.

Another critique of the view of printing technology as an engine in larger processes concerns the very idea of technology as the primary





Goussier del.

Benard fecit.

*Imprimerie en Lettres, l'operation de la casse.*

OPPOSITE | How to print text? The French Enlightenment philosophers Denis Diderot and Jean d’Alembert’s *Encyclopédie* – itself a significant printing project in seventeen text volumes and eleven plate volumes, published between 1751 and 1772 – illustrated the art of printing with a plate of printers, typesetters, and movable types. All text was printed in reverse, and the example shows a sample map of fonts: “Gloire à dieu. Honneur au roi. Salut aux Armes” (roughly, Glory to God. Honour the king. Salute the troops). Denis Diderot and Jean d’Alembert, *Encyclopédie* (1751–72).

cause of social and cultural change. The question is far from simple, but most historians oppose such technological determinism and prefer to see all technologies in a cultural context and as part of a larger system of other technologies. This system and context – all the relationships they consist of – are constantly changing. Words and deeds from a wide range of people – writers, illustrators, printers, and readers, with different intentions, possibilities, and dreams – brought about these changes under historically specific conditions. The existence of a technology with movable printing types was only one of these conditions. Technology, of course, plays a role. Some technology allows certain practices and excludes others. But what a specific technology will actually be used for is never explained by the technology itself. Colonizers and missionaries used the printing press to discipline and to shape; the Pilgrims and other free thinkers used it for liberation from those same powers. On another level, the question could be formulated this way: Would printing technology stabilize – that is, control – the content that was printed, or would it be used to maximize dissemination?

A crucial aspect of the cultural changes that have been ascribed to printing is precisely the spread of the printed matter. But a printing press doesn’t spread anything at all – it only multiplies. To understand dissemination, one must instead consider such things as paper supply and paper prices, as well as the physical distribution of the printed paper products between places by means of individual couriers and eventually an organized mail service. One could just as easily claim that the real revolution occurred in China with the invention of paper about 2,000 years ago, or in northern Italy in the thirteenth century with the many paper mills that were then established, or perhaps in the middle of the nineteenth century when paper became really cheap and could be produced on a completely different scale. And the culture itself is perhaps better described as a paper culture rather than as a print culture. For Europe, one could also highlight the emergence of the postal system. During the seventeenth century, different regional

and national postal services were connected in a continental distribution network – an interactive network of networks, the efficiency of which in turn rested entirely on a physical transport system (roads and horses, waterways and boats) that carried other goods and people.

From the perspective of information management – or as an extension of the distribution aspect – one could focus on systematization, orientation, and overview. Then such phenomena as booksellers and libraries, as well as lists and catalogues, learned societies and church organizations, and their magazines and bibliographies become crucial. The former was needed to be able to access the prints at all, the latter to know what was available, what to choose, and what to ignore amid the perceived growing abundance. None of this arose in a flash but developed over a long period of time and with local variations.

Another important aspect – perhaps *the* most important in the story of a printing revolution and a print culture – concerns the essential stability of information that the printing press as technology is believed to have provided for knowledge advancement. In the history of science, one speaks of *immutable mobiles*, a term coined by French sociologist of science Bruno Latour. By critically comparing fixed information units circulating with the help of print technology and by combining them in new ways, new knowledge is produced. One astronomer, for example, contributed with observations of a comet's position, another made later observations, and a third – who had access to this information – then calculated the comet's orbit.

In the early history of printing, however, piracy and counterfeiting as well as distortions – conscious, ignorant, or due to technical variations and shortcomings – were the rule rather than the exception. The term *piracy* was only established in this context in the middle of the seventeenth century and became more widespread towards the end of the eighteenth century. The more common connotation of reprints had a predominantly positive meaning in terms of dissemination and the taken-for-granted right to improve an original copy.

Danish astronomer Tycho Brahe, despite having his own printing press, had great difficulties in the late sixteenth century in getting his astronomical measurement data properly printed. Several of the works he himself controlled were hand-coloured and for certain recipients adapted hybrids rather than mass printing. Perhaps the most famous illustrations of early modern science, those of the lunar surface in Galileo Galilei's *Sidereus nuncius* (The starry messenger) from 1610, which we mentioned in the introduction, are found in many distorted reprints – what in the original represents the moon's mountains



has become in a pirate print its valleys. The same uncertainty that prevailed about the content applied to the origin, partly as a result of the reprints, but also because notions that we take for granted – of a responsible author or publisher as a guarantor of credibility – are historically developed.

So, the immutability, the supposed stability that print itself is believed to have created, is in fact based on unspoken conventions, agreed norms, and enacted laws, which have shown great differences geographically and over time. The modern history of knowledge can instead be seen as a development towards establishing and maintaining such specific agreements and ideals – not as a result of technology itself, which in fact also enables the exact opposite. We will return to this aspect when it comes to the emergence of a print market and its different roles and functions.

Another aspect of the idea of a printing revolution and a print culture is that it is about as old as the modern art of printing itself. That doesn't make it less valid per se, but should still arouse the historian's suspicion. The narrative's ability to survive is partly due to the fact that it is a straightforward story of progress and success: Gutenberg was the genius who, with the help of technology, dispelled the medieval darkness and paved the way for modern society. It is notable that the institutions that the story pays homage to are precisely those that have reproduced the narrative: the printing and publishing industries, of course, but also the church, the learned world, and eventually journalism. It is not difficult to see that the book as a symbol – rather than an information container – has had the opposite effect of printing technology's alleged liberating effects. By allowing various elite groups, for example, to be portrayed in paintings with books in hand to signal their literacy, the book has consolidated and legitimized social differences rather than undermining them. The book has belonged to those in power.

The printing technology in question produced far more than just books. In fact, the printing presses did not produce any books at all. They produced printed sheets. A linguistic complication – which is linked to the success narrative – is therefore the emphasis on the book itself. In some languages, like Swedish, the most common terms for the craft and for the art of printing itself accentuate the book (*boktryckare*, *boktryck*, *boktryckarkonst*). In English, one is more often (and more correctly) content to talk about the printing press, in French about *l'imprimerie*, and in German about *die Druckerpresse* (although *Buchdruck* is a very common term).

The terms “history of the book,” *histoire du livre*, and *Geschichte des Buchwesens* all refer to a much broader area of knowledge. Despite these very bookish designations, the field is not at all narrowed down to only books. In the words of Robert Darnton, the book historian studies “the social and cultural history of communication by print.” This definition is, however, confusingly narrow in another sense. Books are much older than print, and books for a long time have rarely been printed in the true sense of the word but produced with inkjet technology or electrography. Regardless, it is far from easy to define what a book really is. The book as a symbol is thus very powerful, and symbols are seldom precise in terms of their content.

In some cases, the printed sheets were cut, folded, and bound in codex form – that is, the format we usually call books. This was almost always done by someone other than the printer. But printers also delivered other things than sheets meant to become books. They supplemented their incomes with what is sometimes called “job printing” such as posters, forms, flyers, and visiting cards, printed matter with a more limited lifespan and lower status. Job printing can also be called everyday print. The boundaries are blurry when it comes to book-like forms such as brochures, pamphlets, newspapers, and magazines. Not all of these forms existed from the beginning. For example, newspapers – which, incidentally, were collected annually for a long time and bound into books – are usually said to have appeared around 1600. Visiting cards did not become popular until the nineteenth century. But most forms already existed in the infancy of modern printing. This also includes illustrations.

The early modern era saw an explosion of printed images. These were not printed with movable letter-types but with the old block-printing technique (woodcut). More expensive copper engravings also appeared. From the sixteenth century we see etchings, and towards the end of the eighteenth century, lithographs; the terms indicate different techniques for image production. Not infrequently, these images were produced by all the new printing companies that spread rapidly with the new technology for text printing. And the emergence of the many printing shops that specialized in images is closely linked to the spread of the new text printing technology. This is a good example of how media history did not follow straight lines.

The most fundamental change in visual communication in early modern times was that the pictures and motifs already in existence were given new life and new audiences through print. These images, often in the form of one-page prints, were cheap to produce and



The detailed drawings of human dissections of the Flemish physician and anatomist Andreas Vesalius's *De humani corporis fabrica libri septem* (On the fabric of the human body in seven books), published in 1543, gradually undermined Galen's thousand-year-old medical theories. Andreas Vesalius, *De humani corporis fabrica libri septem* (1543).

transport. Shipping was usually paid by weight, so for larger print volumes – say, a hefty stack of sheets that would become a thick book – a large part of the cost often consisted of transport prices (if you didn't happen to live in a printing metropolis).

Far more people could now enjoy a wide range of content: from the great masters to simple jokes. Europeans could now gain knowledge of exotic animals or distant places, including the New World, through pictures rather than words – partly because not everyone was literate, and partly because literate people, then as well as now, also “read” pictures. It has also been claimed that the jokes and satirical images with a political edge that soon became part of the publishing market contributed to the formation of a politically conscious audience. The same

can be said about the image culture of the Reformation. Luther's pious visage and the pope's equally diabolical countenance became known to many through printed images. The circulation of images such as maps, drawings, and anatomical illustrations also became important in scientific contexts.



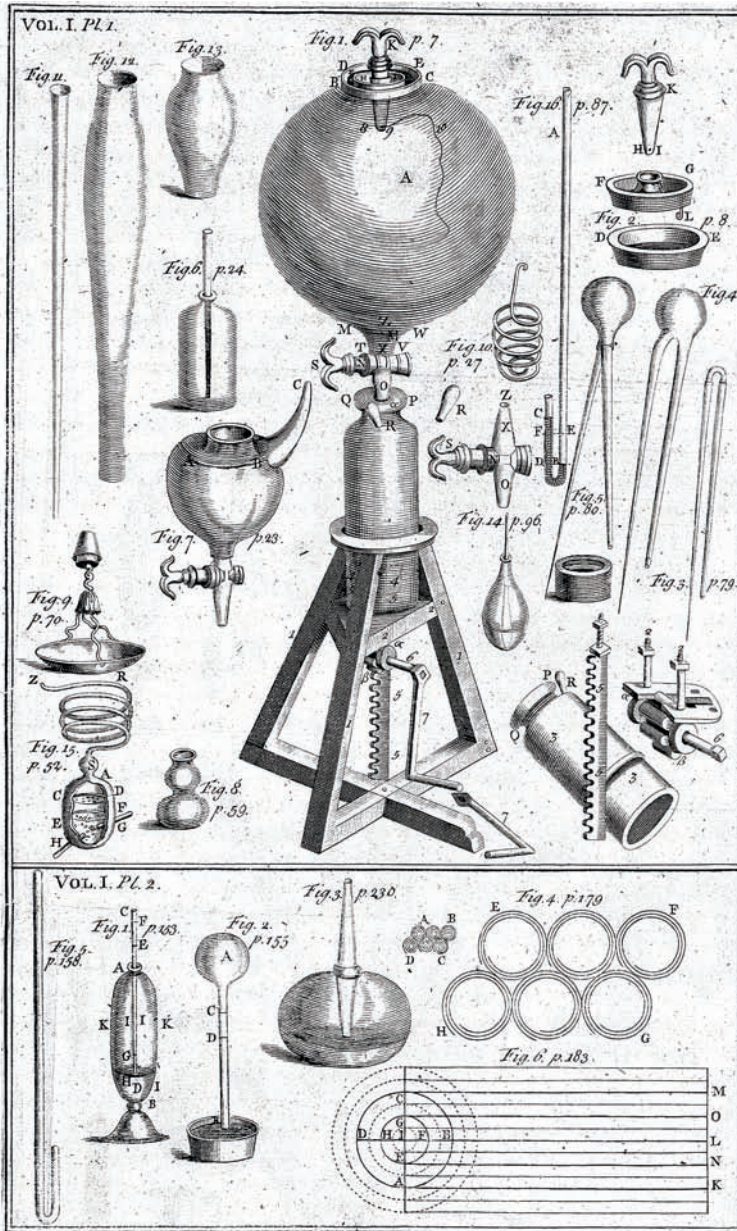
## The Media of the Scientific Revolution

The Scientific Revolution generally refers to the phasing out of the ancient Greek world view adapted to Christianity and the emergence of modern scientific thought. How and when to locate this tipping point varies. Empirical research, experiments, a development of the ability to express the laws of nature in mathematical terms, and institutionalization are important elements. One starting point or breakthrough is Nicolaus Copernicus's heliocentric world view, published in 1543 in *De revolutionibus orbium coelestium* (On the revolutions of the heavenly spheres). And Isaac Newton's synthesis in *Principia* from 1687 is then seen as a kind of completion. Others have emphasized continuity. Influences from Arabic culture – and from Greek and Indian thinking via the Arabs – were absolutely central to the changes that took place and the science that took shape.

As we have pointed out, the stability of knowledge assumed to be inherent in printing technology itself is better understood as the product of long historical developments. This emerging stability should be seen as part of the essence of the Scientific Revolution rather than as its cause. Scholarly journals published by scientific academies and societies, bibliographies, and libraries were an infrastructure that promoted precisely this type of stability, while at the same time circulating these published pieces of knowledge. This infrastructure thus relied largely on printing technology.

Within a broad conceptualization of media, different types of models and measuring instruments must also be considered media technologies. A barometer – one of the most famous being Evangelista Torricelli's mercury variant from 1643 – registers, conveys, translates, or, in other words, mediates the atmospheric pressure to a scale readable by the observing person. Close at hand is McLuhan's definition of media as extensions of man – that is, technologies that in various ways sharpen or scale up human senses and abilities. If it is difficult to digest Scottish mathematician John Napier's counting sticks (described in 1617) or German Otto von Guericke's vacuum pump (demonstrated





Science as image – a way to spread knowledge to a wider audience, and one that was not necessarily literate. This is an illustration of an air pump with accessories from chemist Robert Boyle's 1660 study *New Experiments Physico-Mechanical Touching the Spring of the Air and Its Effects*. Boyle designed several different air and vacuum pumps when he studied physical and chemical phenomena. The law that applies to all gases, Boyle's law, states that the pressure and volume of a gas have an inverse relationship. Robert Boyle, *New Experiments Physico-Mechanical Touching the Spring of the Air and Its Effects* (1660).

in 1654) as media, it is easier to see the telescope and the microscope, both from the early seventeenth century, as mediating technologies.

A different aspect of media in the Scientific Revolution has to do with its public features. Instruments and experiments can be said to prove various natural phenomena. But the key to the success of experimental science was that the experiments were witnessed by an audience. This was done either through open demonstrations or in print. The seventeenth-century chemist Robert Boyle, as famously portrayed by historians of science Steven Shapin and Simon Schaffer in 1985, not only made sure of a socially and professionally qualified audience but also strived to make it as large as possible. A new model for how science was legitimized took shape. The implications are far-reaching and still at hand: not only is science a resource for the audience, but the audience is also a resource for science. In other words, science must take into account its audience. There is no sharp boundary between the scientific production of knowledge in the laboratory and the communication of its results.

## ■ ■ ■ Print Capitalism

*De imitatione Christi* (The imitation of Christ), attributed to the German-Dutch canon regular Thomas à Kempis, was first printed in 1471. Before the end of the century, it had been published in a hundred editions and in several languages. By the middle of the seventeenth century, the number of editions may have been well over 700. The New Testament in various vernacular languages – and eventually the entire Bible – was also one of the bestsellers of the sixteenth century, as was Luther's *Small Catechism* (1529). The variations are significant, but an average print run for a book, even in larger language areas and over a long period, was 500 to 1,000 copies. For many small to mid-sized publishers, and for books that are not bestsellers, this is still true, and e-books are forcing this number below 500 for paper copies. Yet works like almanacs could be published in the millions in the eighteenth century. There was money to be made, sometimes fortunes.

Many of the early printing houses were established and operated with close connection to the interests of the state and the church. The printers were often private contractors, but privileges were granted only when the authorities saw some need. At the same time, official print jobs constituted a necessary income for many printers. In Europe, a certain print capitalism emerged from the outset, a view pre-



sented in Benedict Anderson's *Imagined Communities* (1983). Anderson claims that the printing industry – with the first mass-produced goods – played a crucial role in establishing the modern form of capitalism, in which private actors by agreement buy and sell goods and services on a competitive market, as opposed to a locked and regulated feudal economy.

Print capitalism can thus be linked to the emergence of a consumer society, characterized by increasing consumption across social strata through the supply of non-essential mass-produced goods and services – in contrast to an older society dominated by thrift and scarcity. Goods such as sugar, tobacco, tea, and coffee, as well as glass and silk are examples. The picture includes the commercial theatres that were open to anyone who could pay for admission, as well as the products of the printing presses, from simple single-sheet prints to lavish shelf-warming grand works in folio. The printing presses played a double role. Their products were consumer goods at the same time as they formed the main marketing channel for and source of information to the market at large.

The Frankfurt Book Fair, which remains the world's largest fair for books, traces its roots to 1462 at the latest; the Leipzig Book Fair dates to sometime during the sixteenth century when Catholic Frankfurt was marked by the restrictions of the Counter-Reformation. Despite their cultural airs and pretensions to status, these were, and still are, primarily places of commerce. Catalogues and other types of marketing appeared already in the early days of print. A book often contained a list of the printing house's other offerings.

The very first newspapers are a tangible product of the emerging printing market. A periodical publication kept the printing press steadily occupied and entailed an inflow of capital in the form of subscriptions that could be invested in new titles. Newspaper columns also contained advertising for the printing house's other products, whether in straightforward lists or more sophisticated reviews. When it comes to later newspapers, it is often claimed that their actual product is advertising space, which in order to be sold needed to be packaged in editorial material – usually this so-called commercialization is traced to the second half of the nineteenth century. That is, however, an overly simplistic analysis. News very early became and has remained a commodity, and advertising played a central role from the beginning.

Phenomena that were later perceived as natural and self-evident – and that are now being renegotiated with digital markets – took shape over a long period and in response to the growth of consumer society

and the spread of print. The functions of printer, publisher, and bookseller were for a long time usually managed by one and the same person. Ideas such as copyright and the modern ideal of a sovereign author did not exist. What we perceive as plagiarism – a word that gained momentum only from the second half of the eighteenth century – formed an obvious basis for the growing market. Allegations of literary theft can be found going back to the fifteenth century, as well as early examples of bans such as that instituted by the German-Roman emperor Rudolf II against *typographorum fraudem* around 1600. Individual printers were in some cases granted privileges for specific titles. An early example of more far-reaching legislation is the British Statute of Anne, also known as the Copyright Act 1710: “An act for the encouragement of learning, by vesting the copies of printed books in the authors or purchasers of such copies, during the times therein mentioned.”

Ideas about copyright and individual authorship were strengthened in other ways. A well-known example is how Miguel Cervantes's second part of *Don Quixote*, which was published in 1615 (the first part came out ten years earlier), was a response to someone stealing – borrowing or taking over – his fictional ingenious knight and publishing his own sequel the year before. Cervantes, with his part two, marked his immaterial ownership.

The primary role of the author was also established through the practice of printing the author's portrait or short biography in their books. Yet for a long time, and even as late as the early nineteenth century, piracy could be considered legal (and hence not termed piracy but simply reprinting). This was the case, for example, if the original publisher did not respond to a demand that had arisen, or if the original edition was considered too expensive and the market could be satisfied by less lavish versions. An international agreement on copyright first came with the Berne Convention of 1886.

As we have seen in our discussion about whether printing technology was revolutionary or not, the emergence of protective rights for writers and publishers had the opposite effect to what is often perceived as one of the inherent effects of printing, namely that it automatically promoted widespread dissemination. These protective rights could instead mean – as has been shown for the Romantic period in Great Britain, for example – that the impact of books was limited and came to be reserved for a narrow and elite social stratum. And this happened at precisely the same time as popular literacy was increasing. Since Shakespeare's time, we can find examples of publishers who

bought the rights to several works but refrained from printing some of them based on financial considerations. The stability of knowledge that has been said to be one of the inherent effects of print can also be understood in terms of a control that *inhibits* dissemination. Of course, this condition lends itself to comparisons with today's digitally anchored discussions on copyright legislation that hinders both creativity and the democratic distribution of knowledge.

In the nineteenth century, French author Émile Zola claimed that literary independence was created through the author's sale of his work to the highest bidder on the market. The Enlightenment philosopher Voltaire had, by contrast, entered into agreement with pirate printers a hundred years earlier, not to get paid – he was not dependent on that kind of income – but to have control over and reach out as widely as possible with his writings and his ideas. Patronage in various forms dominated for a long time. The writers produced by the new market were therefore not primarily those who populate our canonized, historical literary overviews. The early commercial writers instead wrote potboilers to earn their daily bread. In Venice, as early as the end of the fifteenth century, a class of writers emerged called *poligrafi*. These were writers who, amid the multilingual and stiff Venetian competition, compiled, edited, translated, and plagiarized texts for popular consumption but also occasionally wrote something original. They can be seen as a continuation of the medieval compilation tradition, at the same time as the printing technology and competition made them individual writers.

With the Counter-Reformation and the decline of Venice as the centre of cosmopolitanism and tolerance, similar breadwinners were found in Amsterdam during the seventeenth century. There, several of them came to work in the emerging newspaper sector. The printed newspaper can be seen as a transformation of the handwritten newsletter, made possible by a developed postal service, the ongoing religious wars, where propaganda needed to spread highly sought-after news, and partly by strict restrictions on printing in France, which created an international and largely underground market for Dutch printing houses. During the eighteenth century and the expansion of the British Empire, as well as the abolition of censorship, London took over the role of Europe's printing centre. Grub Street came to be associated with the potboilers hacks of the time, some of them increasingly referred to as newsmen or journalists. To protect themselves from piracy, London's printers had early on formed economic alliances. One model that was established was the subscription – charging in

advance for a planned work. These collaborations and financing practices also enabled publication of more lavish works such as encyclopedias and atlas books. Another effect was to establish the publisher as performing a special function in the printing market.

## ■ ■ ■ Politics and the Public Sphere

Vernacular language – and by extension the imagined communities associated with modern nation-states – has been understood as both a result of and a precondition for the growth of the printing market. When the art of printing was first established, Latin dominated Europe as a written language and the common means of communication in diplomacy, religion, and science. Otherwise, the continent was characterized by hundreds of dialects. For example, although there was no standardized German language, a printed text in a language that sufficiently united the common German would have a significantly larger market than a text in any specific German dialect. Exactly how this happened is not easy to explain, but translations of the New Testament and other religious works into diverse languages played a normative role. Through the pulpit and its role as a mass medium, the power of print was also enforced through the oral communication of the priest. This print-driven, self-reinforcing process was also supplemented gradually by dictionaries and grammars that codified the languages.

Printed texts originating from one language area were at the same time discussed in other parts of a country (or geopolitical area). In addition, newspapers with their regularity contributed to the experience of belonging to *one* audience, the national, which travelled forward through history. If in the past these social bonds were primarily vertical – with a king of God’s grace at the top who could be replaced through war or new alliances – they now became increasingly horizontal, more stable, and forward-looking. The modern nation-state and nineteenth-century nationalism, as well as the notion of history as progression, can be perceived as products of media-technological change.

However, the development was hardly straight. The decline of Latin had various causes and in some areas was delayed. There are scholars who have characterized this homogeneous national printing culture as an unhistorical rationalization rather than a historical reality – “a postindustrial fantasy of preindustrial print’s efficacy,” as historian Trish Loughran puts it. Heterogeneity and local print cultures, which were only randomly and unevenly linked to a larger national context,



## A Bourgeois Public Sphere | JÜRGEN HABERMAS

*Strukturwandel der Öffentlichkeit* was published in 1962. Almost twenty years later it was translated into English with the title *The Structural Transformation of the Public Sphere*. According to German philosopher and sociologist Jürgen Habermas, something new arose in Europe during the seventeenth and eighteenth centuries: a sphere for public debate, existing beyond the reach of the state and the confines of private households. The sphere was *in principle* accessible to everyone in their capacity as private individuals – not as representatives of a class, a guild, or another type of social grouping. This theoretical openness came with an assumption of equality between the discussants and the belief that some social issues transcended all special interests.

The emergence of the public sphere coincided with the development of free-market capitalism, the nation-state, and the arrival of a new and relatively independent layer of society: the bourgeoisie. Money and education enabled this middle class to achieve its autonomous position, which manifested itself and was maintained through the institutions of the bourgeois public sphere: coffeehouses, learned societies, salons, and – not least – newspapers and journals. Initially, the public sphere was an aesthetic, apolitical arbiter of taste, but it gradually took on a political flavour. Those who participated began to assert themselves as the embodiment of public opinion – and as the state's *sole* legitimate source of authority. A key point made by Habermas is that public opinion did not lead the debate in the public sphere – it was through the public exchange of views that it came about and took shape.

The new sphere gradually replaced a previously dominant representative one. Facts and arguments replaced arbitrary

decisions and time-honoured entitlements. Habermas focuses primarily on developments in the United Kingdom, where public political debate in the early nineteenth century cracked Parliament's exclusivity – in short, political elites were forced to listen to public opinion. The Reform Act passed in 1832 and the following election are seen as a highlight. Then, according to Habermas, it all went downhill. Political, economic, and social developments led the bourgeois public sphere to lose its autonomy and thus its role as a critical political force. It was re-feudalized. Public debate was succeeded by consumption. Deliberation (active political participation) was replaced by acclamation – a yes or no to ready-formulated alternatives. The newspaper ceased to be a mediator and amplifier of public debate and was instead converted into a profit-maximizing and manipulative medium.

Extensive criticism has been levelled at Habermas's interpretation. A focus on a male middle class undervalues other forms of public activity and portrays the public sphere as far too homogeneous. His preoccupation with a few highbrow journals neglects other forms of media and portrays public life in the eighteenth and early nineteenth centuries in an idealized manner, free from commercial interests and sensationalism. And his account of the “decline” is too simple: media consumers have never been as passive and easily manipulated as Habermas claimed, and equating the twentieth century's mediated political life with medieval public representation is rather glib. Although its explanatory power is debatable, the term “public sphere” has nevertheless had a major impact on scholarship and on contemporary debates about the public arena.





The public sphere (with debating gentlemen) in its infancy. Interior of a coffee-house in London, probably late 1690s. The painting by an unknown artist is dated to 1668, yet the clothing and fashion suggest a date in the mid- or late 1690s. British Museum, London.

is a better description. The relatively homogeneous print-based and national communities that eventually emerged were not the result of printing technology itself but of purposeful, political coordination.

When the growing media market is viewed from both a political and public perspective, it is referred to as a public sphere. In his famous answer in 1784 to the question of what the Enlightenment was, the philosopher Immanuel Kant said that it was a civic duty to make public use of one's reason. The modern meaning of the concept of the public sphere – that the good society is created, maintained, and legitimized in and through rational and open exchange of opinions – was established during the second half of the eighteenth century.

Opinions are divided about when and to what extent the ideal of a public sphere was put into practice, including how the development is to be understood in detail. On one hand, it has been described as a gradual realization (for example, from local to national), on the other hand as a very jerky process (temporary progress that took place in dif-

ferent places and forms). Some have argued that the public exchange of views began in the religious sphere (with the Reformation), broadened to include scientific and literary issues (the Scientific Revolution and the early Enlightenment), until finally, when it had matured sufficiently, also addressed political issues – which then erupted in the great revolutions of the eighteenth century and began the establishment of modern Western democracy. Other scholars see religious, cultural, and scientific discussions as simultaneously political – the Reformation, for example, was also a political project.

The public sphere – as we argue throughout this book – thus consisted of *more* than printed texts and images. The theatres and public squares, the coffee houses and the taverns, the clubs and the societies, the letters and the postal services were as important as the books and newspapers. What is “most important” has varied with time and place. It also depends on what is meant precisely – important for whom and for what? – and so cannot be stated on a general level.

## Memory, Rights, and Literacy



At an overall societal level, print had one crucial function where most other media fell short – as memory. The German Reformation in the early 1500s, the French Religious Wars in the later 1500s, and the English Civil War in the mid-1600s all contained elements that can be described in terms of the public sphere. Through printed documentation, they were widely available to posterity, including to American and French revolutionaries in the second half of the eighteenth century. This printed memory was, of course, biased and incomplete, but nonetheless accessible and was invoked to build upon.

Something similar can be said about freedom of the press legislation. From being an exception – that is, the rule was a general prohibition against printing from which exceptions were made in the form of special privileges – the idea of *the right to print* began to be established. What was exempted from this general right (such as blasphemy, insult, and treason) was specified. On closer inspection, this development is very uneven, full of setbacks and geographically variable, and the early modern era did not mark the dawn of the freedom of the press throughout the Western world. Far from it.

The Swedish Freedom of the Press Ordinance from 1766 is often seen as the oldest in the world of a constitutional nature. What followed, however, with the later Gustavian autocracy was a gradual

tightening of freedom of the press that, by 1800, had become severely restrictive. A parallel is the revolution in France and its promises of freedom, equality, and fraternity conveyed through a sea of writings, which after the so-called Terror and ensuing coups, eventually resulted in the emperor's dictatorial control of the media in 1804. But as with the general memory function of print, it can be argued that the idea of freedom of the press was established during this period: restrictions were hereafter increasingly regarded as restrictions on a fundamental right.

The establishment of freedom of the press, however, was not only (or even primarily) seen from the standpoint of individual rights but in terms of its benefit to the state. The public good benefited from freedom of print – within regulated limits, of course. This could be justified in various ways, from the monarchs' need to be informed about the sentiments of the population to the promotion of knowledge, which in turn contributed to the treasury and to international economic, cultural, and military competitiveness. Thus, those in power have by no means always been opposed to the freedom of written expression. One can also speak of a more reluctant approval, due to what might be described as a conservative dilemma. Excessively strict regulation contributes to an underground and uncontrollable spread of rumours that can be more dangerous than open criticism.

But, of course, various forms of repressive measures were also present in this period: everything from the Catholic Church's famous printed catalogue *Index librorum prohibitorum* of dangerous and therefore forbidden literature – in force from 1559 to 1966 – to privileges and licences, to taxes, fees, censorship, revocation (that is, seizure), and prosecution with consequent fines and penalties, including the death penalty. It is also true that some repressive measures were also regulations of a more constructive nature – a kind of print-culture maintenance. A good example is a Swedish *ensor librorum* during the so-called Age of Liberty (1719–72), Niklas von Oelreich. In addition to defending Enlightenment ideas, he had strong views on what he perceived as poor language and weaknesses in argumentation. He withheld his *imprimatur* (his approval) until the author in question had properly worked through, corrected, and proofread his text. Unfounded rumours and fake news – which of course are not new phenomena – were seen as undeniably dangerous, and it was perceived as legitimate to curb them. Yet another side of the story are the attempts to circumvent and avoid government regulations: from clandestine communication, like manuscripts circulating in secret and smuggling

works across borders, including fake places of publication and pseudonyms, to the use of ciphers and codes, allegories, fables, and irony.

That printing caused literacy to increase gradually during the early modern period is a fact. Regional variations were considerable. Especially in mainly Protestant countries, governments promoted reading and writing campaigns. The philosophy held that Christians should be able to read the word of God for themselves and be good and law-abiding subjects. The priest controlled their progress through so-called catechetical meetings (which were more often experienced as interrogations).

It has always been difficult to control print. It has been even more difficult to regulate the interpretations of individual readers, not least with regards to the word of God. A well-known case, highlighted by Italian historian Carlo Ginzburg in *The Cheese and the Worms* (1983), is the northern Italian miller Domenico Scandella, known as Menocchio, whose interpretation of the Bible strongly contradicted the official teachings of the Roman Catholic Church. Among other things, Menocchio claimed that Jesus's mother Mary was not a virgin and that the Holy Father did not receive his power from God. From the minutes of the trial, one can conclude which texts he had read, including his idiosyncratic view of the creation of the world. In a mass of earth, air, water, and fire – Menocchio likened it to a curd – the angels were created, whom he compared to worms. He was burned at the stake for heresy in 1599. Although not as imaginative as Menocchio, but with still greater impact, creative readings of scripture were behind various revivalist movements within the Protestant Church, such as seventeenth-century Pietism and eighteenth-century Moravianism.

It is also common to speak of a revolution in the history of reading. One can trace a development from an intensive to an extensive way of reading: from a few texts that were read over and over again to many and different types of texts that were read once or at least only a few times. Linked to this development is the transition from reading aloud to silent reading, which in turn can be tied to a more private and introverted style of reading and a process of individualization. It is common to highlight the latter eighteenth century as a turning point. However, these are very drawn-out and far from straightforward historical events – recall Seneca's 2,000-year-old complaints about superficially devouring a text. Today's criticism of the excessive consumption of short, web-borne texts, and people's inability to concentrate on longer pieces of writing, also hearkens back to Seneca's complaint. The recommended corrective today is to read novels, which historically has

American historian Robert Darnton, who since the end of the 1960s has been mainly devoted to the history of the book in pre-revolutionary France, summarized some of his observations in an article in *The American Historical Review* in 2000. He argues there “that every age was an age of information, each in its own way, and that communication systems have always shaped events.” Historians have paid little attention to this insight. Hence, our understanding of virtually every historical epoch may deserve to be reconsidered from this perspective.

Darnton takes for an example Paris around 1750, and he begins with a simple question: There and then, how did one find out what had happened and what was going on? In short, how did Parisians receive news? A first answer is very simple: They went to the Krakow tree in Le Jardin de Palais-Royal. The place was a central node for the exchange of oral information.

From this information hub, Darnton unravels a very complex communication network. It contains spoken, sung, written, and printed information that circulated back and forth between different media forms, up and down through social hierarchies. This includes police spies and (semi-)professional news collectors and distributors, but also maids and servants, as well as prelates and nobles. What was conveyed were facts, embroidered stories, elaborate interpretations, vague rumours, blunt gossip – and, of course, pure lies. It was about everything from compromising information about the sexual misfortunes and adventures of the royal court, to the latest political-philosophical ideas. It ranged from the forbidden and underground to the official and legal. The system always

included discussions that conditioned the messages that circulated – at the same time as these messages were influencing individuals and groups in the network. Some fictitious elements and stories became accepted truths.

This is how public opinion or collective consciousness is created: in a multi-media system with built-in feedback. In this case, the feedback system would help erode the legitimacy of the French monarchy and, over time, would be part of events that lead to the collapse of France’s political system.

Darnton’s findings present several interesting challenges to dominant interpretations in the history of communication. First, it is pointless to separate oral and written communication when it comes to broad cultural and societal contexts. A term like “print culture” is fundamentally misleading, given its interdependence with other media forms. Second, it is not very meaningful to establish communication hierarchies in order to find an origin: It is not the source (if such can be said to exist at all) that is interesting but the reinforcement, transformation, dissemination, and feedback processes that make messages meaningful and effective. These processes are best described in terms of convergence and feedback, rather than as trickling or seeping or as linear dissemination. Third, it is inaccurate to speak of popular and elite culture as two separate spheres. Social hierarchies are certainly real, but audiences and messages are constantly moving across these boundaries. Historians – and interpreters of our own time – are therefore wise to try to identify these transcendent connections, in terms of both physical and social places as well as media forms.



been associated with dangerous escapism, not least when it comes to women's reading. The notion that reading in older times was always intense and performed aloud is simply wrong. But as a low-resolution image of changes during the early modern period, the story is justified.

## The Modern Experience – Media in the Nineteenth Century



With the nineteenth century begins what is called the late modern era. Much during this century appears familiar to us, at least compared with previous times. Many technologies and institutions that we take for granted for understanding ourselves and our society – from an organized registration of collective and individual memory to self-reflexively viewing ourselves as an audience – are nineteenth-century creations, including the modern museum, the national archive and library, statistics, photographs, sound recordings, and film.

*The Magic Lantern* (1835) by French silhouette artist Auguste Edouart. A showman performs a domestic magic lantern show – with painted glass images projected onto a screen – while an elderly man with a wooden leg provides musical accompaniment on a barrel organ. Metropolitan Museum of Art, New York.



Lightning-fast electric communication became possible with the telegraph during the first half of the century, and towards its end with telephony. Industrially produced newspapers – printed with steam power and eventually electricity on thin wood-pulp paper and not, as before, on thick rag paper – looked much like the newspapers that are still published today. Towards the end of the nineteenth century, some of them were printed in millions of copies. Publishing houses that are still active or that have recently been absorbed into so-called media houses were established, and the book market expanded enormously. Publisher-bound products (so-called edition binding) could be borrowed at one of the increasing number of public libraries or purchased from booksellers with attractive display windows. Other factory-made consumer goods began to be sold in given dimensions and weights in standardized packaging, which has since become an important mass medium. The mail-order trade and the department store were also established during this period, as well as sound recordings, moving images, and X-ray images.

The oldest preserved photograph was made in 1826 or 1827. The process was based on asphalt, called solar writing (heliography), and required an exposure time of about eight hours. An early photographic technique with a major commercial impact was the daguerreotype. The oldest preserved image is from 1837. The images, made on silver-plated copper plates, were not only very sensitive but also impossible to reproduce. The history of modern photography – with positive paper made from negative – is usually considered to begin during the 1840s. The various techniques that began to be developed also made it possible to produce copies.

Beginning with the so-called cartomania (*carte de visite* or visiting-card mania) that hit the Western world in the early 1860s and collected in mass-produced albums manufactured for the purpose, photographs from the nineteenth century show environments and people who look familiar to today's viewer. The hairstyles, clothes, and poses are a little different today, and the street scenes have some new elements. But compared with depictions of people from the eighteenth century, dressed in heavy woollen fabric (frieze), breeches, clogs, powder, and wigs, nineteenth-century Westerners in many ways look like we do today. These people had experienced or had seen pictures of such things as propelling steamboats and powerful ocean steamers; railways with snorting locomotives; horse-, steam-, and eventually electrically powered trams; chain-driven bicycles; street signs; billboards and sandwich boys; elevator rides; world exhibitions and international



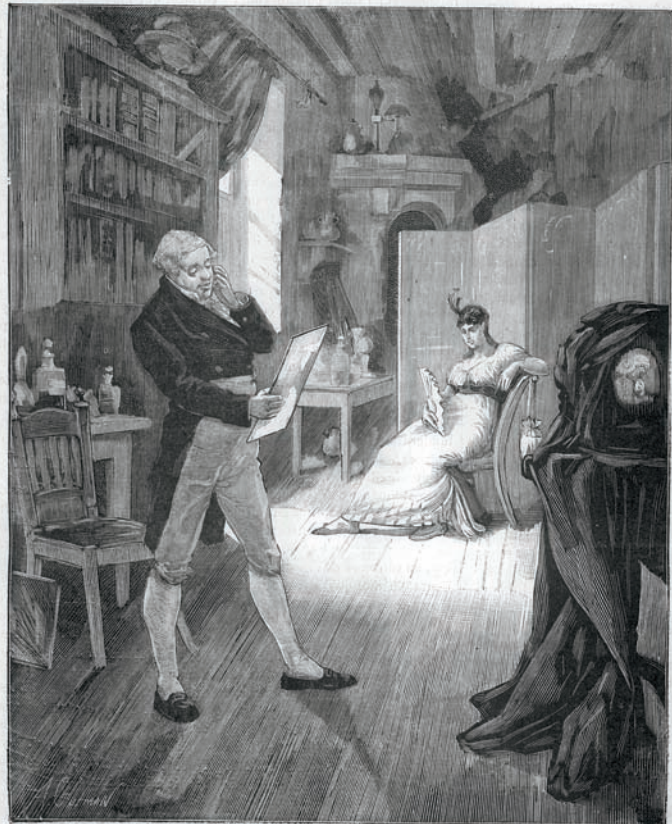
# LA SCIENCE POPULAIRE

13 AVRIL 1882

JOURNAL HEBDOMADAIRE ILLUSTRÉ

3<sup>e</sup> ANNÉE

N° 113. — Prix : 15 centimes Rédacteur en chef : ADOLPHE BITARD BUREAUX : 48, RUE DU CHATEAU-D'EAU  
**Abonnements.** — PARIS, un an, 3 fr.; six mois, 4 fr. — DÉPARTEMENTS, un an, 10 fr.; six mois, 5 fr. — ÉTRANGER, un an, 12 fr.  
**SOMMAIRE.** — **TEXTES.** — Nicéphore Niépce et l'invention de la photographie. — Acoustique : le timbre (suite). — Astronomie : Mérites, révolutions, passé, etc. — *Le Génie des lèbres* : Mammifères constructeurs. — *La Télégraphie électrique*, ses débuts à Paris. — *L'Air* : la Terre et l'Eau : Neiges et glaciers. — *Viticulture* : Les signes à racines tuberculeuses. — *Art industriels* : Calques sur toile — *Chronique scientifique et faits divers.* — **CONNAISSANCES UTILES, etc., etc.**  
**ILLUSTRATIONS.** — Nicéphore Niépce. — Premières expériences héliographiques. — Acoustique : Diagramme des vibrations sonores (2 fig.). — *Le Génie des lèbres* : Caneaux et leurs constructions. — L'Ondatra, ou rat musqué d'Amérique, et sa hutte. — Le Coyote



Nicéphore Niépce. — Premières expériences de photographie p. 130, col. 1).

It is indeed blurry, the oldest preserved photograph by Nicéphore Niépce, "View from the Window at Le Gras" from 1826 or 1827. More than fifty years later, the French magazine *La Science Populaire* (13 April 1882) imagined his discovery of the photographic medium (without showing what the first photo looked like).  
 Wikimedia Commons.



congresses; mass meetings led by revival preachers or socialist agitators, protest marches, and gatherings of striking workers; grand museums, illusion-creating panoramas, wax cabinets, and stereo images; travelling circuses, electrical light shows; amusement parks; and advertising gimmicks disguised as dramatic balloon flights.

Several of the people in these old photographs probably indulged in idol worship of a rather modern type. Perhaps they bought Jenny Lind cigars, candies, and shawls. Many commodities were marketed with the name of the world-famous Swedish singer in the 1840s and '50s on tour in both Europe and North America. Of course, the same is true of many other celebrities of the time, whose portraits became coveted goods.

Modernity – or the modern experience – includes the feeling that everything is changing. The people we see in these photographs expected that tomorrow would be different. Not infrequently, these

The city of Stockholm with the island Skeppsholmen seen to the left, from 1846 – likely the first known daguerreotype of Stockholm. The photographer is unknown. The long exposure times of daguerreotypes (a few minutes) resulted in difficulty clearly depicting moving objects. That is why the ships on Saltsjön appear as foggy vessels. Stockholm City Museum.





*La Daguerreotypomanie*. It soon became apparent that the daguerreotype would change how we see the world. In this lithograph by French artist Théodore Maurisset from 1839, mechanical depiction posed a deadly threat to his own profession. Gallows were available for hire by engravers to commit suicide because their jobs had been taken away by the advent of the camera. The J. Paul Getty Museum, Los Angeles.

thoughts were expressed in relation to changes in the area of media technologies. A commentator on the newspapers in 1828 spoke of “a change in mindset and opinions, whereby nothing can last from one day to the next.” Everything was aflutter. All that was solid melted into air, as later formulated by Karl Marx. On one hand, this could create deep anxiety; on the other hand, it could take the form of a strong belief in progress. Just as often it yielded both.

Even language itself was changing. From the middle of the eighteenth century to the middle of the nineteenth century – the era of revolutions – an older conceptual world was largely replaced by a newer one (and for us today a more familiar one). The significance of linguistic shifts and innovations cannot be overstated. Language is ultimately the medium that sets the boundaries for human thoughts,





“The plates of the present work are impressed by the agency of Light alone, without any aid whatever from the artist’s pencil,” Henry Fox Talbot stated in *The Pencil of Nature* (1844–46), the first commercially published book to be illustrated with calotypes. Since daguerreotypes could not be reproduced, Fox Talbot’s calotypes, and the photographic negative-positive print process he invented, had a commercial advantage. In 1844 the first photographic printing firm was established in the town of Reading, England. Talbot operated the camera at the centre. Metropolitan Museum of Art, New York.

experiences, and scope of action. A world that lacks our concepts is a different world from the standpoint of human experience. In the context of political history, when foundational concepts such as the state, freedom, and democracy meant something else, reality was different.

Some examples with immediate relevance to media history – which in various ways is intertwined with politics – concern both conceptual shifts and linguistic innovations. Around 1800, *public opinion* was established as a term to denote a social institution with the legitimacy to comment on and be listened to when it came to issues perceived as common, or *public*. The term *opinion* had previously, and contrarily, denoted prejudices and delusions – what the Enlightenment was determined to dispel and fight. The Enlightenment itself, with its claims to universal truths, gave way to new, rival ideologies, to different “-isms” spread across a political spectrum of opinion: liberalism, conservatism, socialism, and communism. The leaders of these views were often newspapermen who were given the new name of *publicists*. They claimed not only to shape and nurture, but also to reflect public opinion. A new collective name for periodicals was established, *the press*. The role of the *journalists* was carved out to eventually include

interviews. *The fourth estate* was referred to from the end of the eighteenth century and was firmly established as an idea across the Western world by the end of the nineteenth century.

At the same time, the similarities between then and now are deceptive. Not everything was fixed and in place in 1800. These changes occurred over a long period of time and with significant regional variation – some parts of the world were hardly affected at all. Still, the levels of human mobility, capital flows, and the circulation of news and cultural content make it relevant to speak of a world marked by globalization. “Many people living at the time already saw expanded horizons of thought and action as a distinguishing feature of their epoch,” says historian Jürgen Osterhammel in his book *The Transformation of the World: A Global History of the Nineteenth Century*. “Many millions did not shrink from undertaking an actual journey into the unknown.” Then again, the process was asymmetrical, with the (not especially well-defined) West firmly being established as the standard.

From time to time, new media have been thematized in specific cultural contexts – as in the traditional Japanese kabuki theatre. In this woodcut by Ochiai Yoshiiku from 1870 a camera is visible to the right. “Sakigake shashin kagami yakusha no e,” photographic pioneer reflects actors in pictures – the kabuki play was about photography. The man in the middle is upset over a photograph in his hand, while the other actors smile. The play (whose author is unknown) told the story of one of Japan’s first professional photographers, Uchida Kuichi. If famous kabuki actors had long been depicted in woodcuts like this one, around 1870 they would also have started to appear in photography. Library of Congress, Washington, DC.





A.

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B.



Act of looking. The unknown young woman with a Beckers Tabletop Stereoscope was photographed in the Porter Photograph Parlours studio in Janesville, Wisconsin, in the mid-1860s. Metropolitan Museum of Art, New York.

OPPOSITE | In the middle of the nineteenth century photographs were sometimes accompanied by explanatory texts that today may seem peculiar or superfluous. In a scientific monograph on a stranded blue whale from 1867 readers were warned that images may “contain various things that have no relevance.” It was not, for example, the logs in the back or the crowd behind the whale that viewers were meant to look at, but the giant whale in the middle. Our contextually conditioned way of seeing – which is easily perceived as something natural – also has a history. August Wilhelm Malm, *Monographie illustrée du baleinoptère trouvée le 29 octobre 1865 sur la côte occidentale de Suède* (Stockholm: P.A. Norstedt & söner, 1867).



The nineteenth century was a world significantly more similar to our own time compared with earlier times, in terms of both media technology and language, but it was certainly not the same world. Even small variations can make a big difference. The risk of anachronistic identification – to miss nuances and believe that you are seeing the familiar – is only greater. The word *correspondent*, for example, could for a long time (in many languages) refer either to a lay contributor or to a professional writer contracted and remunerated by the newspaper. The widespread notion during the Enlightenment that citizens had the right to have their texts published in the newspaper endured in many places. Ideals of visual representation and imagery

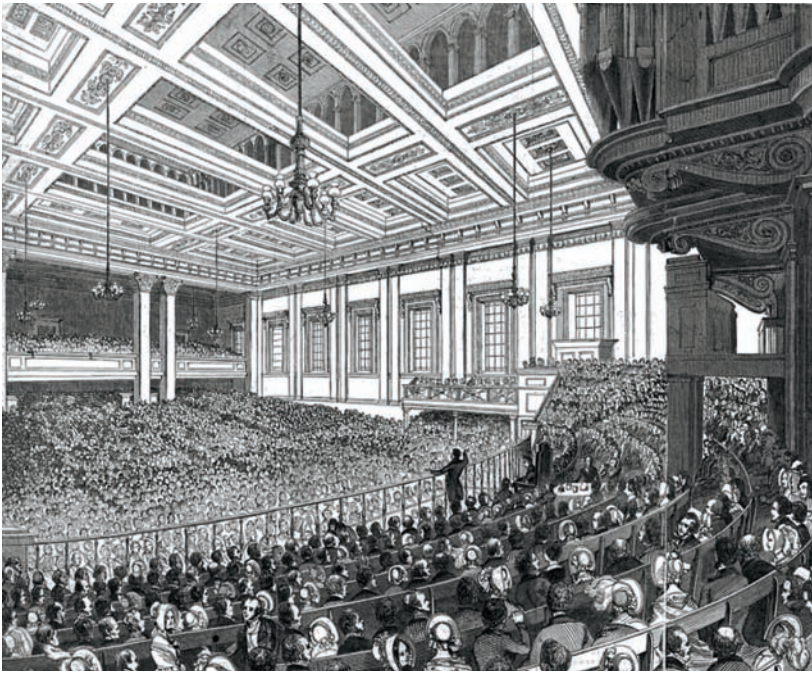
also differed. Objectivity was for a long time about capturing the essence of nature, not about depicting individual things as accurately as possible. A stylized drawing of a flower could therefore be perceived as more “objective” than a photograph of an actual specimen. Whether X-ray photography was a technique for imaginative entertainment or should be used for medical diagnosis was initially an open question.

## ■ ■ ■ Speech in the Public Sphere

Despite the emergence of the mass press and the flood of books, spoken communication remained hugely significant in the public culture of the nineteenth century. There is a common perception that this period represented a media revolution, with a modern print culture developing and displacing a mainly oral culture. According to this view, individual reading was established as the dominant cultural practice in the 1800s. However, it could be argued that the publicly spoken and heard word actually consolidated its position over the century. Oral communication became more important than ever – in politics, in the rule of law, in scientific lectures, and in the spread of religious messages. Vocal delivery can be seen as a form of both mass entertainment and political mobilization.

Speakers attracted enormous audiences who often listened to speeches for hours on end. Events were held far and wide by travelling orators, political agitators, and preachers. Exeter Hall in London had a capacity of 4,000 people. Outdoor reform meetings in England are estimated to have attracted up to 30,000 spectators when radical celebrities like William Cobbett and Henry Hunt were speaking. In Ireland, Daniel O’Connell’s campaigns for reform and repeal during the 1830s and ’40s included “monster-meetings.” And in the summer of 1847 even a temperance meeting in Hällestad in the Swedish province of Östergötland was able to attract 3,000 people. Over the course of three hours, they were fired up by the politically radical and fervently revivalist curate Jonas Janzon – to the point where “darkness descended on the listeners,” according to one witness. As another member of the audience put it, “there is something indescribably great and enchanting in a mass of people with a common ideal, as if fused into a single body driven by the same spirit.” Elsewhere on the spectrum, beginning at mid-century international congresses adopted the form of spectacular, large-scale events that lasted for days, not including the drawn-out build-up and after-parties. And the scale just kept on





“‘May meetings’ in the metropolis – interior of Exeter Hall.” Speaking in front of thousands of people worked, as long as the acoustics were acceptable, the speaker had good voice resources and was exalted above the audience, and the latter kept quiet. But this was not always the case in Exeter Hall. A contemporary listener wrote: “The conformation of the Hall is not favourable to the larger class of human voices, and there are but few speakers who make themselves well heard throughout the room: the generality speak too low, or have too little power of lungs to be heard far beyond the centre of the area; while others, who almost deafen the sitters near them, are equally unintelligible to those at a distance, from the echo of the place itself.” The observation – made in *Random Recollections of Exeter Hall, in 1834–1837* – underlines the inaudible feature of spectacle and its symbolic manifestation. Exactly *what* was said was sometimes subordinate to the fact that it *was* said in front of a large audience. “The medium is the message,” to borrow from Marshall McLuhan. One can also note that the magazine illustration did not represent a specific occasion but rather sought to capture the general character of the May meetings. *Illustrated London News*, May 1844.

growing over the years. Before long, it was not uncommon to express a sense of meeting overload or congress fatigue.

The impact of these assemblies must be understood in relation to the limited voting rights and generally weak political organization of the time. The views that these meetings expressed laid a justifiable claim to be expressions of public opinion. The older means of stating a collective opinion in the form of petitions – that is, letters

OPPOSITE | Athanasius Kircher's *Neue Hall und ThonKunst* (1684) is one of the first treatises to develop acoustic principles for conical tube as a sound amplifier for the human voice – that is, a megaphone. For hundreds of years, megaphones looked pretty much the same. In a photograph from the shooting of *Love's Crucible* (1921), director Victor Sjöström shouts instructions through a megaphone, flanked by fellow director Mauritz Stiller (right), and the cinematographer Julius Jaenzon behind his Pathé camera. Smaller, more practical, and portable electric megaphones first came with transistor technology in the mid-twentieth century. Athanasius Kircher, *Neue Hall und ThonKunst* (1684), and the Swedish Film Institute, Stockholm, respectively.

containing a collection of signatures submitted to an authority – was, in Britain from the middle of the nineteenth century, increasingly replaced by popular meetings as the primary expression of public opinion. Contrary to the established narrative of declining orality, these meetings could be seen as a historical move *from* a written form *to* an oral one, an example of the rarely straight lines along which media history develops.

Yet as we have seen in other contexts, these meetings were not disconnected from other forms of media. For one thing, they were audiovisual rather than strictly auditory events. Gestures and performance played a major role, as did the venue for the event. Music was a common feature. At the same time, the speeches delivered should not be confused with everyday talk or associated with a kind of Homeric feat of memory, as they were usually written down. There were certainly freewheeling discussions, but the organizers generally maintained control over who took part and what was said. Question-and-answer sessions were more likely to take the form of directed theatre than what we would today think of as open debate. Indeed, a similar criticism is levelled at modern televised debates, which are also based on a well-established dramatic device – *for* clashes with *against*, and consensus or even a slight shift of stance is not really part of the concept.

After the speeches were given, the versions that were issued in print were usually reproductions of the script, touched up by the speaker after the event. This oral culture with audiovisual support was thus rooted in the written form. The newspapers also gave these events plenty of coverage. Assemblies, local political meetings, speeches at inaugurations and celebrations, sermons – all were reproduced, often in great detail and accompanied by comments on the speakers' performance and manner. Charismatic presence and naturalness were valued when assessing their ability to win over the crowd, and some





speakers established their own style, creating a reputation in the process. While the aforementioned Jonas Janzon may have held a certain local cachet, a temperance crusader like Peter Wieselgren enjoyed a national reputation across Sweden, illustrating the status of these events as entertainment. Wherever he appeared in the 1840s, supporters and opponents of the temperance movement said the same thing: “Of course, we’re going to go and listen to Wieselgren.”

These speeches and meetings took up considerable column inches in newspapers. In Britain, the nineteenth-century press has been described as a parasite on this oral *platform culture* – a contemporary term that today designates a different type of information space. This view is not unreasonable: minutes of meetings and accompanying speeches were a cheap and easy way to fill newspaper pages, and it is well known that audiences enjoy reading about themselves (or watching themselves on film or TV). However, a more nuanced view perceives these events as a form of symbiosis – a cycle of mutual reinforcement that includes other media forms, and where the driving actors were often involved on multiple levels.

Various successful reform movements illustrate the point. The meetings in favour of the proposed reforms were advertised in the newspapers. At the meetings, petitions were set up to collect signatures (to show the numerical and social support for the views) and incoming telegrams expressed advocacy for the cause (while also underscoring the interest in and geographical spread of the opinion). Special deputations presented these lists to the head of state (the monarch, the emperor, the prime minister), who were also able to read about the meetings in the press. These visits were in turn covered extensively in the newspapers and subsequently raised in parliamentary debates as a sign of broad public support for the proposal. The proceedings in parliament were then commented on in the press. And so on. This model represents a systematic and driven campaign. In short, there was a media strategy. The losing opponents were therefore able to claim that an artificial storm of public opinion had been created. The victors, on the other hand, could firmly state that by using the means of communication available, they had harmonized the will of the people with the parliamentary system.

If we turn our attention to the major international congresses – those that focused on peace, social issues, and the abolition of slavery – we see that the media apparatus they mobilized was no less extensive than the one that various national reformists had at their disposal. These large-scale international events helped to establish the very

idea of an international sphere as a legitimate arena for expressions of opinion – an innovation at the heart of which was the spoken word.

## The Medium Par Excellence?



In surveys of media history, the newspaper often appears as the most important medium during the nineteenth century. In some versions, newspapers represent the beginning of media history. This is because, from the middle of the twentieth century, a rather narrow concept of media dominated, largely coloured by the self-knowledge of news media institutions. As discussed in our introduction, not so long ago the term *media* was synonymous with newspapers, radio, and television. This is largely because journalism had become an economic and political power, developed into both an industry and a social institution called the press or the fourth estate, and which organized itself and marketed the idea of its importance and its history. Self-promotion is, by definition, what institutions do, and this particular institution had the power to spread its message and self-image. To a large extent, therefore, the story of the modern press was already fixed during the nineteenth century. The narrative reads something like this: Before its breakthrough, there was no real public exchange of opinions, and once the modern press had been established, more or less all information and knowledge circulated via the newspapers. Certainly, newspapers existed before the nineteenth century, but they were incomplete and amateurish; books and other media had nothing that came close to the enormous impact of the press. As we have seen in our survey of diverse forms of media from earlier periods, this narrative is not only simplistic, but wrong.

Another reason why the newspaper stands out among different media has to do with the special properties of the medium. Newspapers are considered to have promoted the idea of history as forward looking and progressive. They are perceived as excellent for registering and documenting the passage of time, including perceptions of changes in attitudes, events, and people. And probably just as important: newspapers are plentiful and relatively easy to preserve. The historian who wants to know something about the nineteenth century seldom neglects its newspapers.

This also applies to the media historian, regardless of where his or her interest lies. Ephemeral or temporary media forms such as mass meetings or exhibitions, can only be accessed indirectly. The





“Büchersaal der neuen Bibliothek im Britischen Museum zu London.” In 1869, the German illustrated magazine *Illustrirte Zeitung* featured an image from the vast library of the British Museum, where the same journal naturally could be found. Rijksmuseum, Amsterdam.

same applies to more enduring but inherently mute media expressions that we need help to interpret (such as photographs and monuments), as well as contemporary experiences of anything but wordless media (such as novels and, indeed, other newspapers). Newspapers are simply an excellent route into the past.

The insight is far from new. Already in the eighteenth century, some observers commented on the usefulness of newspapers from a teaching point of view, and for their historical content. Algot Scarin, professor of history and ethics in Turku, in present-day Finland, lectured in the late 1730s on “*historiam politicam ex actis publicis*,” that is, political history from public documents, in which he included

newspapers. Towards the end of the nineteenth century, one could even speak of *pressophilia*:

The world's largest collection of newspapers is the one in the British Museum. It contains all English newspapers from the first years of the eighteenth century and a lot of foreign papers. The weight of the huge mass of paper is estimated at about 600 tons. Achen's Zeitungs Museum, the only one of its kind in the world, a work by the zealous collector O v. Forckenbeck, now counts 55,000 different newspapers. No less than 365 newspapers regularly send their issues here ... From a purely scholarly point of view, *pressophilia* has a major mission. For all modern historical research, the study of the press is necessary; for the history of war as well as for the history of culture, for the biographer as well as for the teller of social life, the daily press is an indispensable guide, directly by illuminating historical facts, indirectly as a result of the currents of different cultural eras.

Newspapers – whether on newsprint, on microfilm, or as scanned images or OCR-processed digital files – are more important to those of us today who want to understand the broader media landscape of the nineteenth century than they were for people of that time. We must not confuse our contemporary situation in the newspaper archive with the media situation of the past. As we argue throughout this book, to say which medium has been most important for various people, events, and situations in the past requires more precise questions. Yet, as a rule we can assume that any specific medium has always been entangled with other media.

Whoever took part in one of the century's many statue inaugurations – say, that of Engelbrekt on the main square in provincial Örebro, Sweden, on 14 October 1864, or of Giordano Bruno in Campo de' Fiori in Rome, Italy, on 9 June 1889 – not only “read” the monument itself. They had read for months, not to say years, in advance, in the local newspapers and the national press, about the old freedom fighter Engelbrekt's efforts as ringleader in 1434 or the freethinking monk Bruno burned to death for heresy in 1600. And they certainly read about these men's respective links to contemporary liberal and unification movements. Perhaps they borrowed or bought books on the subject, and they most likely read about which dignitaries would attend the inauguration. Once on site on the big day, speeches were heard and impressions received from the orchestra as well as from the attending



In 1889 a statue of the Italian Dominican friar, philosopher, and cosmological theorist Giordano Bruno was inaugurated among crowds gathered at the square Campo de' Fiori in Rome at the same spot where he was burned at the stake for heresy in 1600. The sculptor Ettore Ferrari was a secular artist, and Pope Leo XIII claimed that “the purpose was to insult the Papacy.” Wikimedia Commons.

crowd itself. These impressions could then be confirmed, exaggerated, or perhaps corrected by the newspaper reporting afterwards.

Without the statues themselves, none of these impressions would have happened. And they still stand – as do many other of the tens of thousands of monuments erected around the world during the monument craze of the nineteenth century, although quite a few have been removed or even destroyed for political reasons, a fact that underlines their potency as mass media. More people have seen Engelbrekt and Bruno than ever read a single newspaper article about them. The point is not that statues are more important than newspapers, but that the question of which medium was most important is not possible to answer on a general level, nor is it particularly interesting to ask. Newspapers, supplemented by such artifacts as letters, photographs, memoirs, and minutes of meetings, make it possible to analyze the complex media links that history consists of. This does not mean that

the newspapers of the time conveyed a neutral and objective image of history. Far from it. As source material, they must be handled with critical methods, and knowledge of their historically changing production conditions is essential.

## The Modern Press



The growth of newspapers in the nineteenth century was enormous. The first non-imperialist newspaper in South America was possibly *Diário do Rio de Janeiro*, published from 1821; the first domestic paper initiated in the Middle East was likely the Egyptian *Vekayi-I Misrye* (Egyptian Affairs) from 1828. As newspaper publishing spread globally, it also grew regionally in parts of the world where the phenomenon was long established but had been limited to a few places. In the UK and the US, newspaper editions reached into the millions by the end of the nineteenth century. Provincial papers had significantly smaller editions; circulation of 500 would have been considered a success. At the beginning of the century, most newspapers were set in one column and in quarto format (think of an ordinary book); towards the end of the century formats were gigantic and the text set in five, six, or even more columns.

Until the middle of the century, it was not uncommon for ordinary subscribers to have their newspapers bound in annual volumes – so that they in effect became books – and it was also common for newspapers to provide indexes of the previous year’s content. This practice ceased almost completely towards the end of the century. Only a few libraries and other institutions continued to bind newspapers in collected volumes. For individual subscribers, yesterday’s newspaper was turned into rubbish or something to wrap food in, to start a fire with, or to use in the privy.

Press clipping bureaus were established. They functioned as search engines and sorting tools that made the increasingly extensive news flood manageable. Fast-reading young women – who could be compared to the algorithms of our time – made it possible for customers to get an overview of their interests in an increasing information flow. The customers were for the most part companies, authorities, and scholars. The average reader, too, could save clippings and collect them in designated scrapbooks: with recipes, poems, nice pictures, celebrity portraits, or an assortment of these.





Eva Bonnier, *Hushållsföreståndarinna* (The housekeeper), 1890. Nationalmuseum, Stockholm.

Niche newspapers and magazines had appeared before, but now the periodical buffet had something for everyone. The political newspapers included not only those of Liberals, Conservatives, and Social Democrats, but papers inspired by various political issues, such as temperance and women's rights. The revivalist movements and the missionary enterprises had their own papers. The same applies to various types of trade magazines (say, for booksellers or beekeepers), as well as publications for leisure and hobbies (e.g., for gardeners or bicyclists), and so-called family magazines.

The print landscape also included illustrated magazines. Illustrations became more common around the middle of the century owing to a new technology called xylography, based on wood engraving. The fact that photography began to spread at the same time is only indirectly noticeable in newspapers since photographs often formed the basis for the drawings that were xylographed. The technique for reproducing photographs directly did not become popular until the beginning of the twentieth century. Initially, illustrations appeared in the expanding advertising departments, but also in so-called folk



newspapers and the early comic press. The proper illustrated papers had their role models in *The Illustrated London News* from 1842; the Leipzig-based *Illustrierte Zeitung*, started the same year; and *L'Illustration*, published in Paris from the following year. The former survived until 2003; the latter two ceased publication in 1944.

This enormous growth was the result of increasing literacy rates, appealing content, and lower prices owing to cheaper production costs. Around 1800, an annual subscription to a newspaper might cost a handyman more than a week's wages. At the end of the century, a subscription could cost the equivalent of US\$20 per year in today's money. Growing editions contributed to rising advertising revenues, which in turn lowered prices further. The formula for success is often ascribed to Émile de Girardin, who started the Paris newspaper *La Presse* in 1836 based on these principles. Launched in Vienna in 1848, *Die Presse* is an example of a direct copy of Girardin's approach, but the model soon became the standard in the newspaper industry. And it can be said to have been the foundation for the so-called penny press in the United States, which is usually dated to the 1830s. Towards the end of the century, many newspapers, not least in the American

*The True American* (1874), by Enoch Wood Perry. The artist is mocking the impossible ideal of national unity. Concealed behind a newspaper, Perry commented on the ignorance of the voting population in the United States during the Reconstruction era after the American Civil War. Metropolitan Museum of Art, New York.



OPPOSITE | *Harper's Weekly* was an American political magazine based in New York City and published between 1857 and 1916. Already by the 1860s the circulation was more than 200,000 copies, and the magazine was the most widely read journal in the US during the Civil War. It became increasingly involved in the abolitionist movement and during the summer of 1863 published an article on the escaped slave Gordon, with illustrations of his back, which had been scarred by whippings. A year later, in order to further promote the anti-slavery cause, *Harper's Weekly* published a wood engraving of Wilson Chinn, an emancipated slave. The editors noted that Chinn's former master "was accustomed to brand his negroes, and Wilson has on his forehead the letters 'V.B.M.'" Counterclockwise from top left: Abraham Lincoln, *Harper's Weekly*, 10 November 1860, Wikimedia Commons; "A Typical Negro," *Harper's Weekly*, 4 July 1863, Wikimedia Commons; "Wilson," 1864, Metropolitan Museum of Art, New York.

so-called yellow press, were accused of accelerating the number of daily editions with sensationalism and scandals – more or less real, often greatly exaggerated, and usually with conspicuous headlines.

What at first sight makes newspapers in some northern European countries from the end of the nineteenth century appear more modern and accessible than those from the beginning of the century is that the antikva – the Roman characters of the printing style we are used to – had seriously started to replace the previously dominant so-called blackletter or textura (sometimes also called Gothic style). But for those who were used to blackletter, it was of course not at all difficult to read or perceived as obsolete. The shifts from blackletter to antikva had clear political dimensions. The former was German, the latter was associated with France. Therefore, the development differs markedly. In Norway and Denmark, the blackletter persisted well into the twentieth century. Somewhat unexpectedly – given that in popular culture it is still the number one badass font – it was banned in Nazi Germany in 1941 for all official print because it was claimed to be of Jewish origin.

Profound changes occurred in terms of editorial principles, content, and production technology. Except for the big papers in the great metropolises, the newspaper at the beginning of the twentieth century was very often published by the printer, who filled it with readers' contributions (news, poems, advice, and discussion items) and cuttings from other papers, with no editing principles other than obeying the law and common decency. The emergence of *the press* meant a relative professionalization, politicization, commercialization, and industrialization. These processes were neither initiated nor completed during the nineteenth century.

# HARPER'S WEEKLY

JOURNAL OF CIVILIZATION

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THE ESCAPEE GORDON, FIRST IN MISSISSIPPI, SECOND IN MISSISSIPPI (Photograph of Wilson)



Wilson.  
Branded Slave from New Orleans.

### [A TYPICAL NEGRO.]

We publish herewith three portraits, from photographs by M'Pherson and Oliver, of the negro Gordon, who escaped from his master in Mississippi, and came into our lines at Baton Rouge in March last. One of these portraits represents the man as he entered our lines, with clothes torn and covered with mud and dirt from his long race through the swamps and bayous, chased as he had been for days and nights by his master with several neighbors and a pack of blood-hounds; another shows him as he underwent the surgical examination previous to being mustered into the service—his back furrowed and seared with the traces of a whipping administered on Christmas-day last; and the third represents him in United States uniform, bearing the musket and prepared for duty.

This negro displayed unusual intelligence and energy. In order to foil the scent of the blood-hounds who were chasing him he took from his plantation onions, which he carried in his pockets. After crossing each creek or swamp he rubbed his body freely with these onions, and thus, no doubt, frequently threw the dogs off the scent.

At one time in Louisiana he served our troops

as guide, and on one expedition was unfortunately taken prisoner by the rebels, who, infuriated beyond measure, tied him up and beat him, leaving him for dead. He came to life, however, and once more made his escape to our lines.

By way of illustrating the degree of brutality which slavery has developed among the whites in the section of country from which this negro came, we append the following extract from a letter in the New York Times, recounting what was told by

the refugees from Mrs. GILLESPIE'S estate on the Black River:

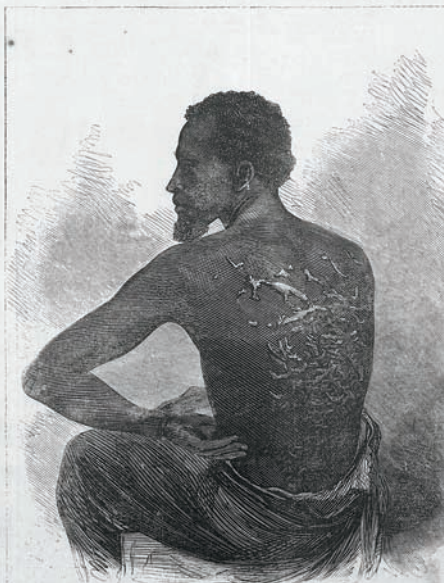
The treatment of the slaves, they say, has been growing worse and worse for the last six or seven years. Flung with a leather strap on the naked body is common; also, padding the body with a horse-manure until the skin is a mass of blisters, and then breaking the blisters with the teeth of the cow. They have "very often" seen slaves stretched out upon the ground with "hands and feet held down by fish-bones, or indeed to some degree, into the ground for "punishment." Handfuls of dry corn-bran are then lighted, and the burning embers are "chipped" up with a stick, so as to fall in showers of live sparks upon the naked back. This is continued until the victim is covered with blisters. If in his tortures the slave gets his hands free to break off the live, the burning brand is applied to them.

Another method of punishment, which is inflicted for the higher order of crimes, such as running away, or other refractory conduct, is to dig a hole in the ground large enough for the slave to squat in. The victim is then stripped naked and placed in the hole, and a covering or grating of green sticks is laid over the opening. Upon this a quick fire is built, and the fire smokes upward through upon the naked back of the slave, until his body is blistered and swollen almost to bursting. With just enough of life to enable him to crawl, the slave is then allowed to recover from his wounds if he can, or to end his suffering by death.

"Charley Sio" and "Overton," two hands, were both murdered by these cruel tortures. "Sio" was whipped to death, after under the sadistic, or soon after punishment. "Overton" was laid naked upon his face and burned as above described, so that the cords of his legs and the



GORDON AS HE ENTERED OUR LINES.



GORDON UNDER MEDICAL INSPECTION.



GORDON IN HIS UNIFORM AS A U. S. SOLDIER.

Professionalization (such as for lawyers and medical doctors) has never applied to the press in the West. The history of journalism education belongs to the twentieth century, with pioneering examples from the preceding century. Yet already during the 1800s, the newspaper profession was often a consciously chosen career with an acknowledged identity, requiring certain knowledge and skills.

The international journalist congresses – a measure of the industry's position and a medium for consolidating and improving its status – were lavish public relations events. The first was held in Antwerp in 1894; on the agenda were, among other things, fake news and peaceful international reporting. The fourth congress assembled in Stockholm in 1897 with some 400 participants from almost every corner of the globe but still dominated by Europeans. They marketed themselves and their profession but also – through abundant reporting home – celebrated the Stockholm Exhibition, which sponsored the congress, and the jubilant Oscar II, who invited all delegates to a grand dinner. Alongside such international endeavours, the press organized itself nationally. Newsman meetings, press clubs, publishers' associations, and trade unions were founded – all with the aim of protecting the industry and/or its practitioners and prepared to handle internal issues and conflicts.

The role of the journalist was also carved out in contemporary fiction. In August Strindberg's novel *Röda rummet* from 1879 – translated into English as *The Red Room* in 1913 – the idealistic civil servant protagonist leaves the drudgery of bureaucracy to become a journalist only to experience corruption and anguish. Other works featured titles like *I kannibalernas land* (In the land of the cannibals) from 1897. Others were more explicitly romantic, such as Cottrel Hoe's (pseudonym for Robert Barr) *Jennie Baxter: Journalist* published in the American *Pocket Magazine* in 1899, which testifies to the fact that women were entering the field. The most iconic reporter for a long time was Henry Morton Stanley, whose books were international bestsellers. These include his 1872 book *How I Found Livingstone* about his hardships after being sent by the *New York Herald* to find the missing Scottish missionary doctor in the unknown depths of Africa. The book was published in huge editions and burnished the image of adventurous journalists.

Another kind of identity-forming literature – which emphasized institutional weight and social significance – was press history. In 1866, historian Heinrich Wuttke published his extensive history of German newspapers, journals, and the formation of public opinion. In Britain





Newspapers had various purposes: “Here is your lunch, as always: two sous worth of cheese, three sous worth of newspaper ... pretty strong stuff this morning! Well, the gruyere cheese seems quite old. In the old days the grocer sold fresh cheese wrapped in old paper, nowadays he sells old cheese in a new paper ... makes no sense!” Capture from Honoré Daumier, “Les journaux chez l’épicier,” *La Caricature*, October 1842.

in the early 1870s, editor James Grant devoted three volumes to the origin, progress, and current position of the press. Many were to follow. Through respectful age and constant progress, the importance of the press was emphasized. The sheer attention the press was given added to its increasing status and prestige. In Germany from the 1910s, the academic study of the press – *Zeitungswissenschaft* – was institutionalized.

Newspapers had long played a political role, but now it became more common for individual papers to explicitly pursue a specific political line. Debates were conducted less often within individual newspapers by committed citizens and increasingly by their editors. These formed into groups – arranging meetings and petitions – which paved the way for the modern system of political parties (which in several Western nations began to take shape at the end of the century). The liberal reforms that were eventually implemented were largely driven by purposeful editors, who were often also members of parliament. It



differs from country to country, but in many nations, it was the rule towards the end of the century that newspapers had a clearly stated political colour: liberal, conservative, and social democratic ideologies dominated, but there were also anarchist and communist papers. This explicit type of opinion-forming newspaper has been regarded as a French tradition rather than an Anglo-American one, where the news was the primary focus and where an ideal of objectivity first began to be articulated. However, the opinion-driven newspapers were hardly completely politicized. In their news reporting, they often strived to be neutral, and the growing number of column inches began to be filled with rich and varied apolitical content – everything from household tips and sports results to stories about exotic places and new inventions.

Advertising was part of print capitalism from the very beginning. Now the industry required the implementation of specific economic strategies on a completely different scale. The physical scope and economic turnover cannot be compared with previous periods, and very large fortunes were amassed. The laconic advertising practices of the eighteenth century – in the style of “I have lemons,” followed by the name of the trader – were developed into artful and richly illustrated full pages.

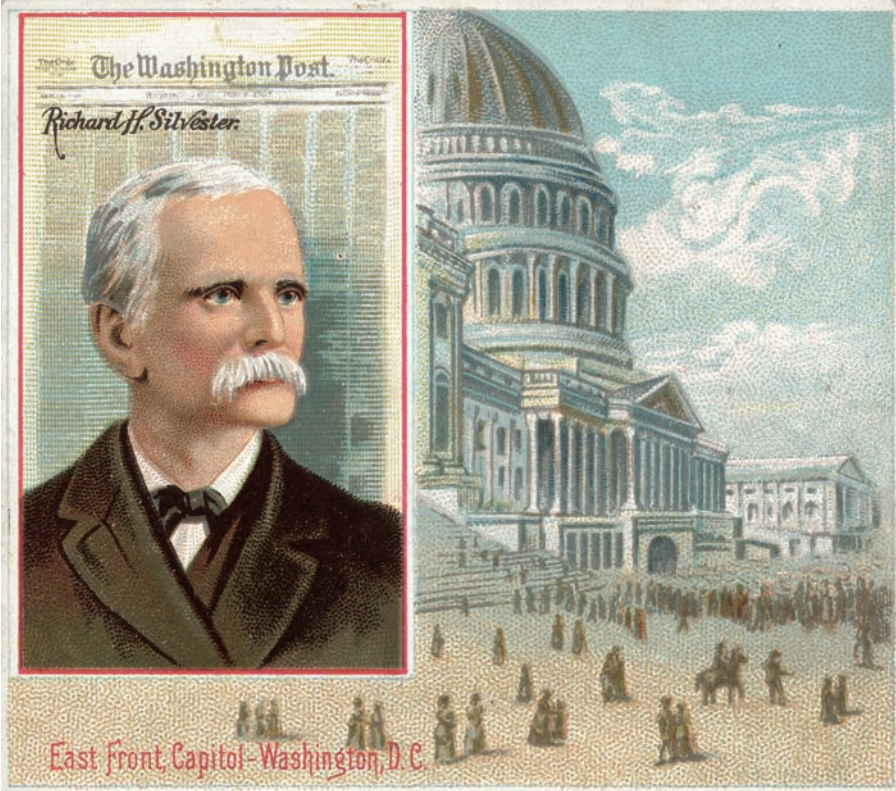
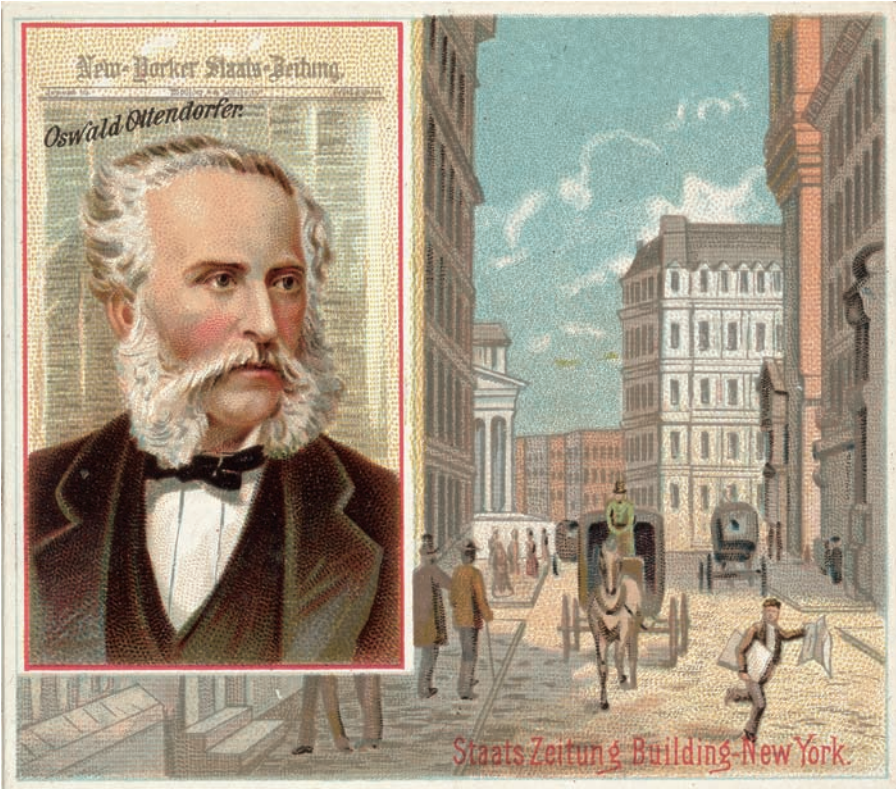
The news increasingly became goods that were bought and sold in a market. The newspaper printer in 1800 published a newspaper simply by subscribing to a number of domestic and foreign papers. From these he – or she, since some printer’s widows had long careers as newspaper publishers – cut and copied pieces freely, and submitted contributions were usually not paid. When news agencies emerged in the 1830s, with the business idea of selling news to papers, the scene changed. Agence Havas was founded in 1835 in France, the Associated Press in 1846 in the United States, Wolff in 1849 in Germany, and Reuters in 1851 in England. As the electric telegraph developed rapidly from the 1850s and began to play a key role as a news distributor, the importance of these agencies increased.

Strengthened copyright was also part of this increasingly complex picture. Formal and informal agreements included demands that the use of stories from other sources be credited and the terms of financial compensation be spelled out. The major international milestone in this regard is the Berne Convention of 1886; international journalist congresses also paid attention to the issue of fees and tariffs.

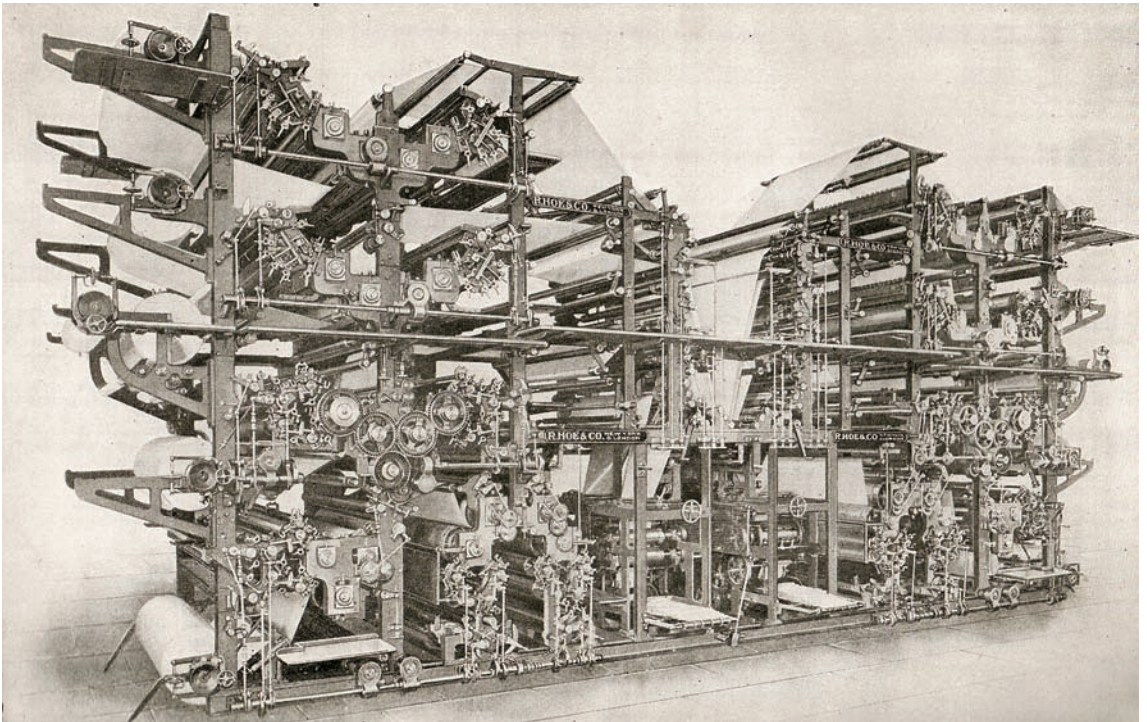
Print runs that numbered in the millions, or even 100,000 or less, presuppose an industrial operation. Yet publications that were run on











ABOVE | “The Double Octuple Newspaper Press.” Already by 1900 the industrial production of newspapers was reminiscent of today’s. The lexicon text informs us: “the largest in use, has a capacity of 96,000 16-page papers per hour, folded to half size and counted.” *Webster’s New Illustrated Dictionary* (1911).

OPPOSITE | Newspaper men as advertisement for Allen & Ginter Cigarettes in 1887. Other series promoting the brand included Great Generals and World’s Inventors. Metropolitan Museum of Art, New York.

increased production speed that came with the rotary presses. These machines printed on both sides of the paper at the same time. The rotary press used by *The Times* in London from 1869 had a printing capacity of 12,000 double-sided sheets per hour.

Another important invention was the typesetter, which used a keyboard to replace the time-consuming setting by hand. At first, the movable types were placed in vertical containers, and a press on the corresponding key on the keyboard brought a type out of the container to join the developing text. Numerous less successful models were developed during the century; Charles Kastenbein obtained an English patent for a successful variant in 1869. However, these kinds of machines were then replaced by the much more reliable line casting or

linotype machines, launched in New York in 1886 and used well into the twentieth century. With these, the types were cast in whole rows (which after use were melted and the metal reused). A skilled typesetter could manually set about 2,000 types per hour; the corresponding figure for machine typing is 5,000–7,000 and for linotyping 8,000.

All these changes – in production conditions and visual appearances, in editorial ideals, text-reuse practices, and copyright norms, and in preconceptions and habits – naturally affected how a newspaper was conceived by its own practitioners and by its audiences. And developments show great geographical variety. It is therefore necessary to be historically sensitive when trying to characterize journalism or individual papers or use them as source material. The press was never a singular entity.



## Electric Media

Telegraphy means distant writing, from the Greek *têle* and *gráfein*. The word came into use in the late eighteenth century, but as a phenomenon it is considerably older. Acoustic telegraphy, for example, includes systems such as the calling messengers of ancient Babylonia or the drum signalling discussed earlier. Optical telegraphy also has a long history in the form of burning beacons, smoke signals, and flags.

Beacons are mentioned in the Icelandic Edda from the early thirteenth century, for example, and in the Swedish Law of Uppland from the end of the same century. The last deployment of the Swedish beacon system is said to have been in 1854 during the Crimean War, when the British fleet was sighted outside Gothenburg and an attack was feared. It apparently took a day for the 500-kilometre chain to reach Stockholm. Later examples were set up in readiness, including a chain of beacons along the sea approach south of Stockholm, at the start of the First World War. The late eighteenth century saw the development of a system of telegraph lines for a more modern type of optical telegraph. This comprised masts with semaphore-like wings, which could be fixed into set positions to mean different things – in other words, a digital technology. The most widely used system of optical telegraphy was invented in 1792 in France by Claude Chappe and later refined during the nineteenth century. A similar system was built by the Swedish inventor Abraham Niclas Edelcrantz; it was first used in 1794 to carry a birthday message to king Gustav IV Adolf over



The age of electric communication was long associated with the first half of the twentieth century. Yet in her book *When Old Technologies Were New: Thinking about Electric Communication in the Late Nineteenth Century* (1988), American communication scholar Carolyn Marvin argued for an earlier breakthrough. Electric communication – which began in the 1830s with the invention of the telegraph – produced as decisive a shift as the art of printing. The latter part of the nineteenth century was especially important, as this was when the five “proto-mass media” were invented: the telephone, the phonograph, electric light, radio, and film. The purpose of Marvin’s study is not primarily to bring forward a “beginning.” Instead, it introduces perspectives and questions that she believed were missing from prior research. The early history of electric communication hence becomes less a history of technological development and more about negotiations around the organization of social life. Which hierarchies are challenged by new media and which are consolidated?

In Marvin’s view, media are complex constructions of habits, beliefs, and practices embedded in culturally and socially determined communications codes. New media are always introduced into a landscape of old media, which is richer in meaning and significance than any single new medium. The focus thus shifts from the technological apparatus to the different groups engaged in a constant negotiation over power, authority, representation, and knowledge – even as this is at the same time a negotiation that is nurtured precisely by technology. New media practices are not generated directly from technologies but are improvised from older practices that no longer work in the new media surroundings.

The best time to study these negotiations is not when new practices have been adopted and order is established – but when they are still unfamiliar and are being experimented with. Marvin identifies a shift from a familiar “one-way communication” to an emerging “two-way communication,” which implied a higher degree of equality between the engaged parties, and thus introduced the possibility of confrontation. Emergent groups of technical experts constructed themselves as an elite – such as by regulating the availability of “electric literacy” and questioning other groups’ attempts to interpret and handle the new technology. Groups that were already socially marginalized – by ethnicity, gender, class – were further marginalized.

One key competence was to realize and acknowledge the blessings of the new electric technologies and to understand the value of the experts who would draw out their potential. This implied an absolute belief in the uniqueness of electric communication and in its revolutionary novelty. In other words, it implicated a firm denial that the new forms of communication only prolonged, magnified, or increased the speed of older oral and written media. As a result, old social rules could not be directly transferred to the new situation. New rules must be established. And the only ones capable of designing the right practices and ideals were consequently these experts. From here, the step was not far to claim that these new prescribed practices and ideals were given by nature or the technologies themselves – or indeed by electricity itself. The perspectives that Marvin offers are of course transferable to other times, including our own.

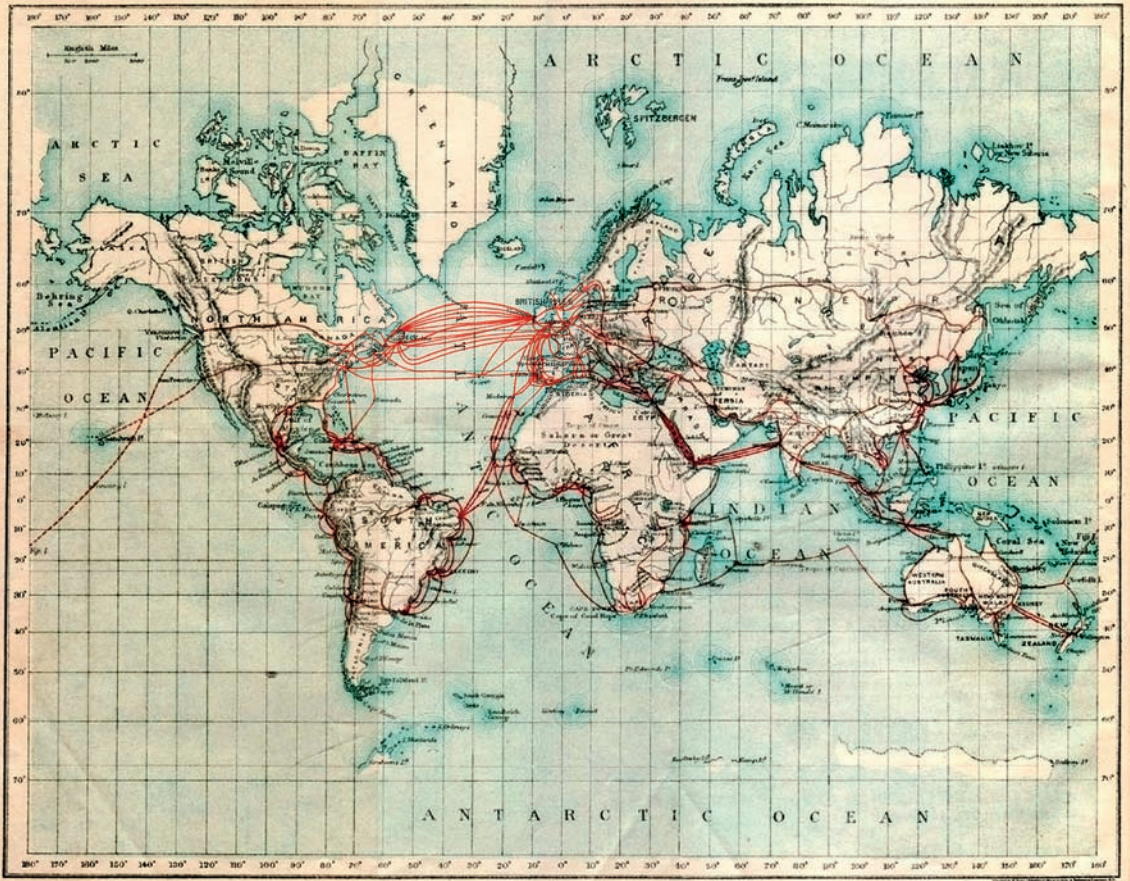
fifteen kilometres, and patriotic reports suggest that it was twice as fast as the competing French systems. Edelcrantz's system was not just digital but binary of sorts, being made up of shutters that were either open (zero) or closed (one). The received number combinations could then be deciphered using a code. The Edelcrantz telegraph lines along the east coast of Sweden proved useful in the war against Russia in 1808.

Another definition of telegraphy – championed by figures such as the American Samuel Morse, the inventor of the code (or software) that in modified form remains the most widely known – states that it must involve a technology for receiving and not just for sending. (The definition clearly doesn't include the human eye and the instructions for interpreting the codes as technologies.) The acoustic and optical examples mentioned would thus not qualify and, under this view, should instead be called semaphore technologies. It wasn't until the 1830s that any electrical system entered regular service. A further advance came in the shape of the teleprinter, a machine that required no knowledge of Morse code, since it was operated using a keyboard and the receiving device similarly translated the electrical impulses back into text. The telegraph network quickly expanded from the 1840s, particularly in the US, a nation with huge distances to cover. Experiments with Atlantic cables were conducted in the late 1850s but only worked sporadically; the first version to be both technically and commercially successful came in 1866. The UK connected up the land route to its Crown colony in India that same year. Australia was linked to the system in 1872. And the first cable under the Pacific Ocean came online in 1902.

The underwater cables needed to be well insulated, otherwise the electrical signals would leak into the water, since water is a good conductor of electricity. The preferred solution was to use vulcanized gutta-percha latex. This rubbery material is extracted from the gutta-percha tree, which grows in the Indonesian archipelago. In the second half of the nineteenth century, it was used in myriad contexts in the Western world, for household products and in industry, but telegraphy had become a great consumer of the plant. So great that its extraction became unsustainable, the industry collapsed, and an ecological disaster ensued. This example of globalization's inequities and locally devastating effects has a familiar and contemporary ring.

A novel feature of the electrical telegraph was its speed. Physical transport can never match the pace of electricity. In fact, the telegraph is said to have created a distinction between transport and communi-

### EASTERN TELEGRAPH CO'S SYSTEM AND ITS GENERAL CONNECTIONS.



The world was interconnected via networks long before the internet. On the world map for the Eastern Telegraph Company from 1901, submarine cables in the global telegraph network are marked in red. Wikimedia Commons.

cation (at least for more complex messages and greater distances). In theory, the telegraph allowed for the transmission of information at the speed of electricity. There was a huge fascination with this technology – the whole world seemed to be connected via a kind of nervous system, where the impulses moved at lightning pace. In practice, however, it is also a story about a means of communication that often broke down, or at least required help from older technologies and infrastructures to function – or was ultimately no more than symbolic in nature. And by the time it had been widely established as a reliable technology, it had begun to face serious competition from another invention: telephony. This is a prime example of how media history





“The Arrival of the Atlantic Cable, in New Foundland.” In the 1890s, about thirty ships were engaged in laying submarine cables. Twenty-four of these were owned by British companies – among them the 211-metre-long, sail-powered, paddle wheel and screw-propelled steamship *Great Eastern*. In addition, two-thirds of the world’s telegraph lines were owned and operated by Britain. Yale University, New Haven.

is rarely about clear watershed moments and sequences, but rather about mutual coexistence.

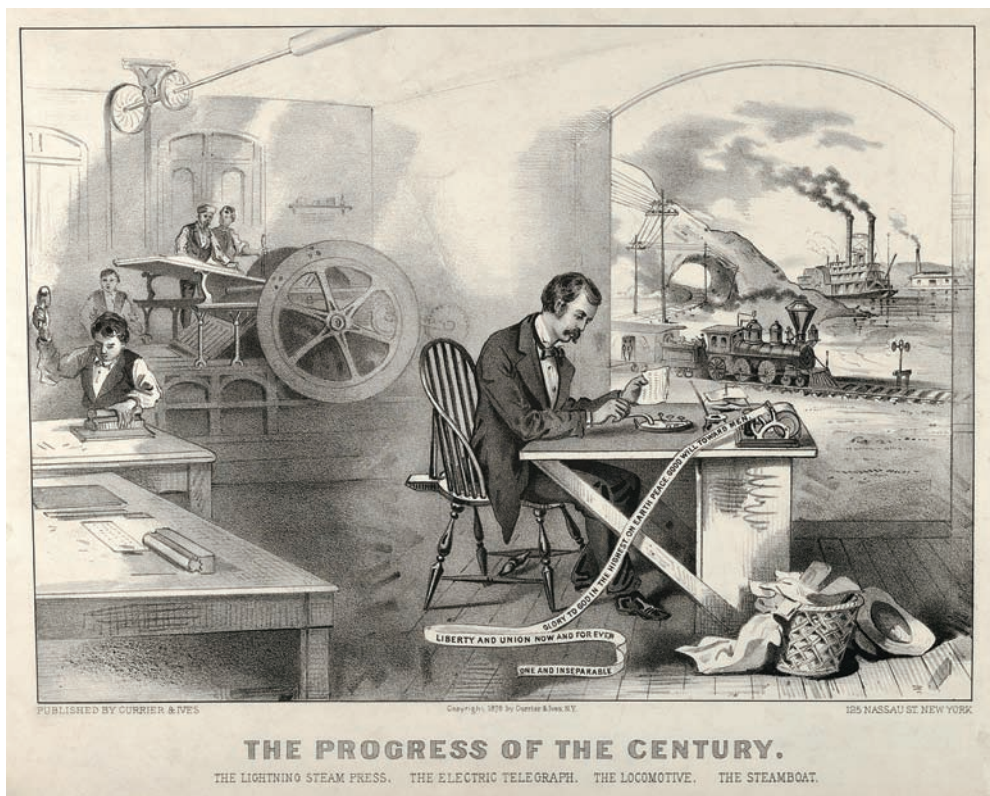
Telegraphy nevertheless made a real impact in areas such as the financial markets, state diplomacy, and the issuing of military orders. Examples from the theatre of war that are often cited regarding telegraphy illustrate the technology’s (potential) blessings and problems. The Battle of New Orleans, which took place between US and British forces on 8 January 1815, claiming many lives, could have been avoided had the new technology been at hand – a peace agreement had been signed before Christmas 1814, but it took seven weeks to get this message from London to Louisiana by ship and couriers. At the other end of the spectrum, it has been suggested that a key reason for the outbreak of the First World War was that the ultimatums and

declarations of war were telegraphed, leaving little room for reflection, and instead forcing and hastening the ensuing events.

Newspapers were early adopters of the newfangled technology, and soon dedicated specific sections to incoming telegrams. However, there is some debate about how the electrical telegraph actually affected the press. Both the style and content are said to have changed. The abbreviated nature of the text permitted little room for editorial positioning, focusing instead on bare facts, and so the telegraph helped to usher in a more objective journalistic style, replacing longer opinion pieces. The technology also encouraged texts to present the most important information at the beginning, since transmission was unreliable, and it was by no means certain that the whole message would get through. The telegram services certainly helped with the commodification of news, and there is no disputing that telegram news was bought and sold in large quantities. However, the high costs led many publishers to avoid paying, and instead they carried on cutting and pasting items from other newspapers. The clippings included telegraphed news, which could then be published in a special section of the newspaper under the rubric “Telegram News.” In these cases, the significance of telegraphy was primarily symbolic – what in practice had been mediated on paper and by ordinary post was lent an air of modernity, of lightning-fast communication via a global nervous system. And at least somewhere along the line, that was certainly true.

But even when news really was mediated by telegraph, the speeds in practice rarely reached their theoretical potential. One of the issues was the so-called last mile problem. The telegraph network bound together strategically located stations – but rarely reached actual users directly. The final stretch had to be handled by a complementary system, for example using school-aged boys as couriers, and they hardly moved at lightning speed. The most famous example relates to a gap in the network between Aachen and Brussels, both of which were connected to telegraph lines in 1851, but not between each other. The gap was bridged with carrier pigeons, completing the connection between Berlin and Paris. The enterprising man behind this endeavor was Paul Julius Reuter, who later founded the Reuters news agency. Yet another side of the story is that vulnerable telegraph networks often suffered service interruptions. There were stretches in the Tropics where the systems collapsed due to termites, rot, and rust, and the early underwater cables were unreliable; there are examples of places where cable failures were so common that agreements were established to put steamships on standby, ready to take over at a moment’s notice,





“The Progress of the Century.” This 1876 lithographic print from the New York firm Currier & Ives hails the nineteenth century’s most innovative inventions: the steam press, the telegraph, the locomotive, and the steamboat. Metropolitan Museum of Art, New York.

and once across the operators urged that the messages were to be forwarded “by the fastest means possible – be it rail or telegraph.” The lines were also easy to sabotage, and to shut down for political reasons.

Some scholars have argued that the telegraph not only was associated with weightless speed and a shrinking world. That kind of rhetoric can be found in certain types of text. But if one looks wider – at ordinary news articles, rather than just poems and exaggerated statements in inauguration speeches – it turns out that they did indeed feature all these practical problems, not to mention practicalities such as poles, copper wire, and relays – anything but weightless things.

Telephony is in many ways bound up closely with telegraphy. Experiments with sound or acoustic telegraphy were conducted with varying degrees of success from the 1840s onwards. However, the big commercial breakthrough came in the 1870s in the US, as a direct

response to developments in the telegraph industry. The American telegraph network saw rapid expansion. The already impressive 2,000 kilometres of cable that existed around 1850 increased tenfold by 1870 or so. The number of companies in the industry headed in the opposite direction, however: from 500 at the peak to essentially just one, Western Union. Through agreements with the news agency Associated Press, the company gained almost total control over telegraphy in the US. This control included a ban on hostile information about Western Union and Associated Press, as well as the power to prevent new players from entering the newspaper market or to stifle undesirables. The fight against this private monopoly – also involving secret agreements – continued until 1945, when Associated Press finally lost an antitrust court case.

The system that would bring about the breakthrough of telephony, patented by Alexander Graham Bell in 1876, was thus a reaction to, and a way to circumvent, Western Union's monopoly on telegraphy. American Telephone and Telegraph (AT&T) was founded by Bell and

The telephone tower in Stockholm during the cold winter of 1890, its wires covered with hoarfrost. In 1885, Stockholm had the most telephones of any European city, and the telephone tower was the main hub for the capital's telephone network between 1887 and 1913. However, the tower became obsolete as telephone companies began using underground cables in urban areas. Tekniska museet, Stockholm.





Switchboard operators in the small city of Sala, in mid-Sweden around 1910. Switchboard operators – usually women – connected calls by inserting a pair of phone plugs into appropriate jacks. In Sweden at the time, the state-owned Televerket, which was responsible for all telecommunications, was the country's largest employer of (unmarried) women. Tekniska museet, Stockholm.

others in 1885; by the middle of the twentieth century, the company controlled around 80 per cent of the telephone market in the US. Bell and his associates had been working successfully from the late 1870s to grow the business and expand the telephone network. However, the real explosion came in the 1890s, when several of Bell's patents expired and a flood of entrepreneurs and inventors entered the market.

How the telephone affected the boundaries between private and public spheres and what it meant for interpersonal communication is, of course, a huge question. One example is the way gender roles were both reinforced and challenged through telephony. There was a recurring discussion in the public arena about women's unawareness that the telephone was a medium for serious business rather than for gossip and chatter. Using the telephone was expensive, after all. The choice faced by men was between not allowing women access to the home telephone – or simply coughing up the money. They generally

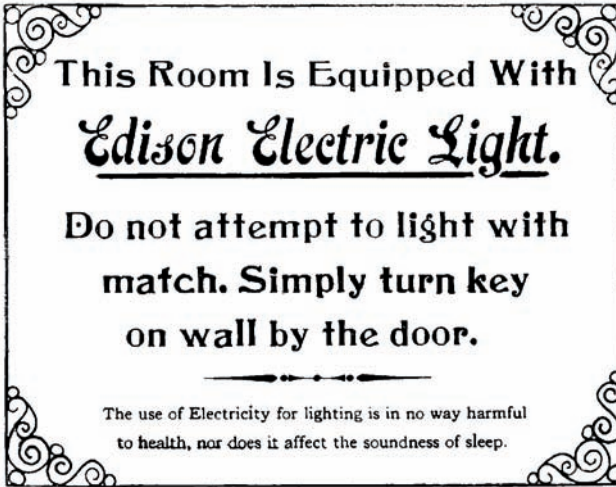


chose the latter, pecuniary sacrifice, which has been posited as a key act of modern chivalry. The challenge to gender roles came from the many women who were able to enter working life as telephonists and telegraphists, where they mediated the communication of mainly men.

Although telephony was seen chiefly as a one-to-one medium, it played a major role as a mass medium. Early services provided news and home entertainment, such as music – features that would soon appear on the radio. *Telefon Hírmondó* (Herald) in Budapest from 1893 is one example. Indeed, in many locations, telephony provided a basic infrastructure for radio in its early days. This is because long-distance broadcasts were distributed via phone lines before being broadcast as radio waves regionally or locally. Telephone lines were also critical to the early history of the internet, of course.

In the 1880s, many cities began installing electric street lighting, and many homes adopted electric light. Mosley Street in the English city of Newcastle is thought to have been the first, in 1879. However, the history of lighting is much longer than this, beginning when humans learned to control fire. Oil lamps and torches were able to provide illumination inside and out. Fifth-century Antioch, in what is now northern Syria, is sometimes claimed to be the first city to have organized street lighting; another candidate is Córdoba, an Islamic city in southern Spain, in the eleventh century. In 1524, all Parisian homeowners were required to have a lamp outside their house. Other options included taking a light with you, either personally or carried by a linkboy. Baltimore had gaslights on its streets in 1802. When it came to lighting homes – and dramatically improving the conditions for reading and intricate work – the paraffin lamp was a great leap forward. It was invented around the middle of the nineteenth century, made its broader commercial breakthrough in the 1860s, and remained by far the dominant lighting technology into the early twentieth century, when electric light began to take over. George Claude's demonstration of two twelve-metre-long bright red neon tubes at the Paris Motor Show in 1910 can be seen as the commercial take-off for a technology that was to change the modern cityscape profoundly.

Naturally, electric light played a practical role already in the nineteenth century, where it really was at hand. Initially, though, it was used for elaborate spectacles of various kinds – a form of entertainment that still seems to exert a significant attraction – or simply as spectacular mood lighting. When the delegates attending the international congress of journalists in Stockholm in 1897 returned by steamer from the royal banquet, they were met not only by a large cheering crowd,



As with all techniques, users needed to accustom themselves. Some scholars argue that Edison's sign first appeared in a hotel room in 1892 – but the request has since become almost apocryphal. On the web, you can today order Edison's vintage sign in a number of different styles. Wikimedia Commons.

flares, burning royal monograms and swinging torches, but also by a giant electric floodlight.

Despite modern communications media and modes of transport, despite electricity and steel, at the end of the nineteenth century everyday communication was still largely based on people sending messages by putting pen to paper and using an intermediary – the postal service. In the most populated parts of big cities, post boxes could be collected, and letters delivered ten to twelve times a day. And if you still couldn't wait for the regular post, local couriers stood ready for action on the busiest street corners, with parallels to modern Uber drivers. These paper-based operations were thus expanding in the middle of the explosion in electricity-driven communications.

## ■ ■ ■ A New Visual Culture

From being a difficult-to-access technology in the mid-nineteenth century that employed only a small number of experimenters, photography became widely accessible to large groups by the end of the century. If users themselves previously had to both prepare and develop their photographic plates, the invention of so-called dry plates, ready made for use, enabled both a broader and more specialized use. At the same time, cameras became easier to handle. American Kodak was the international brand for amateurs; Swedish Hasselblad took up the competition. Admittedly, *cartomania* had already hit the Western



world in the early 1860s. Having one's portrait taken and collecting others in albums was a widespread activity. Towards the end of the century, however, new printing and reproduction techniques made it possible to truly mass-produce images in books, magazines, and as postcards at affordable prices. Still, the breakthrough for press photography did not come until the beginning of the twentieth century.

As we have discussed, the importance and scope of advertisements in the newspaper press increased significantly. With lithography, colourful posters became common in urban spaces. When the chemical industry started to produce cheap synthetic pigments – including a lot of new tones – the development gained even more momentum. Posters, signs, and clothes of the latest fashion showed a more vivid range of colour than ever before. During the second half of the nineteenth century, companies specializing in advertising and marketing were established.

Although museums have a very long history, the modern museum, in terms of size and ambitions, architectural grandeur, and public access, is mostly a nineteenth-century phenomenon. The British Museum in London dates to 1753 and is often recognized as the first of a new kind of museum: national, encyclopedic, and (from 1759) open to the public. It expanded dramatically in the century that followed. Two

A newspaper saleswoman on Potsdamer Platz, Berlin, is depicted in Philipp Kester's 1906 photograph. Münchner Stadtmuseum, Munich.



of its most famous and visited objects, the Parthenon Marbles and the Rosetta Stone, both subjects of international controversy today, were acquired – some would say stolen – at the very beginning of the century.

The ability to *see* was put at the centre in several contexts. Often Swiss educational reformer Johann Heinrich Pestalozzi is regarded as the father of the *Anschauungspädagogik*, or object pedagogy. And just like different technologies for visual instruction became popular in schools, visitors to museums would be given opportunities to experience history, to walk through and gaze upon supposedly authentic environments. This could take the form of transported and rebuilt cultural-historical settings – as in 1881 at the world's first open-air museum, King Oscar's Collection outside Christiania, present-day Oslo in Norway (sometimes including animals and even humans); or at the open-air museum Skansen in Stockholm inaugurated in 1891, or through so-called dioramas, groups of objects arranged against a background, sometimes with special light effects, designed to create a perspectivist overall picture, as at the Biological Museum, next to Skansen and opened in 1893. The dioramas of the Biological Museum were an inspiration for many museums around the world, including the American Museum of Natural History in New York, which opened in 1877. These basically pedagogical aspirations can also be seen in the commercial agencies for popular science lectures that appeared during the century.

With the new visual culture came an expanding entertainment culture. In the provinces, for example, at markets and provided by touring entrepreneurs, one could see sciopticon or magic lantern images, raree-shows and other image media, as well as wax figures and anatomical preparations. By 1900, many cities saw the establishment of permanent attractions, including wax museums and so-called *Kaiser-Panoramas* – a viewing cabinet in which a group could look at rotating stereoscopic photographs at the same time. The most famous wax museum, Madame Tussauds in London, dates to the eighteenth century; the current premises in London were established in 1884. Zoological gardens, too, have a long history as menageries set up to display royal power and splendour. The modern zoo's more immediate origin is found in the scientific zoos that began opening to the public. London Zoo in Regent's Park was established in 1828 and is regarded as the first scientific zoo; it opened its gates to the public in 1847. Located in the middle of the city and arranged to manage large crowds, it became the standard for public zoos. In the 1860s and '70s a host of

Devant “Le Rêve.” As media modernized, illustrated magazines and image reproductions became increasingly enticing. The boys in Paul Emmanuel Legrand’s 1897 painting are thrilled by the reprint of *Le Rêve* (1888), with its encampment of sleeping French soldiers, envisioned as patriotic allegory by Édouard Detaille. Yet Legrand also included a disabled old man with a wooden leg – as a reminder of the brutality of warfare. Musée d’arts de Nantes.



mechanical rides were invented, like steam-powered carousels featuring the “galloping horses” still seen today. The Sea Lion Park at Coney Island in Brooklyn, opened in 1895, is often regarded as the first modern amusement park. The visual culture of the late nineteenth century also includes travelling wild west shows and circus performances.

The most magnificent expressions of the new visual culture were the major industrial exhibitions, especially the so-called world exhibitions. The first of these took place in London in 1851, featuring the Crystal Palace in Hyde Park. The building, an architectural marvel constructed from iron and plate glass, inspired the design of railway stations, department stores, conservatories, and *passages* (like shopping malls) in the world’s major cities. The more famous exhibitions include Chicago in 1893 and Paris in 1889, where the Eiffel Tower was the major attraction. These exhibitions showcased the wonders



## Art and Media | WALTER BENJAMIN

During the late nineteenth century, industrialization, mass production, and urbanization increasingly affected the world of art – from the use of new techniques to the ways that artworks were experienced. Painters, sculptors, architects, and illustrators laid the foundation for a modernist aesthetics. Art also came to be reproduced in new ways. Lithographs and photographs proliferated, and paintings were spread in mass editions. How did such changes alter the status of unique artworks? Could technologically (re)produced culture (like film) even *be* art? Such questions were asked by German philosopher and literary theorist Walter Benjamin in the mid-1930s in his essay “The Work of Art in the Age of Its Technological Reproducibility.”

The reproduction of artworks was nothing new. The Greeks cast bronzes and minted coins in mass editions; in the Middle Ages writing was reproduced mechanically; and later copper engravings and lithographs were added as reproductive techniques. “Around 1900,” according to Benjamin, “technical reproduction had reached a standard that not only permitted it to reproduce all transmitted works of art and thus to cause the most profound change in their impact upon the public; it also had captured a place of its own among the artistic processes.” Film was his prime example.

What suffered, however, was the “aura” of the traditional work of art. Its presence, authenticity, and originality were lost. The artwork was detached from its (often religious) motivation, its awesome inspiration, and became profane and mundane. Through modern technology, a unique creation was transformed into a mass-produced media

object. The decline of the aura was for many art critics a deplorable development – but not for the Marxist Benjamin. Because through reproduction, art became democratically accessible. When art moved from the museum or cathedral to the cinema or illustrated magazine, it could be distributed to the masses – and potentially take on a new political form.

The Soviet-Russian montage film of the 1920s was, for Benjamin, an example of reproducible and politicized art that, with its “shock effect,” could “mobilize the masses.” Such films entailed a “deepening of apperception.” It could make people look again – and realize that political change in society was possible, even necessary. “Our taverns and our metropolitan streets, our offices and furnished rooms, our railroad stations and our factories appeared to have us locked up hopelessly,” Benjamin wrote. “Then came the film and burst this prison-world asunder by the dynamite of the tenth of a second, so that now, in the midst of its far-clung ruins and debris, we calmly and adventurously go traveling.”

Benjamin also believed that reproduction had an effect on art in its traditional form. His thesis was therefore both about the spread of art in mass editions – with its political potential – and about how modern reproductive techniques changed the very meaning of an artwork. Reproduction, copying, repercussion: all media forms build on each other and many exist in parallel. But they also influence each other retroactively. Benjamin’s idea of media repercussion – similar to the concept of remediation – presupposed that media development at the same time always looked back.

of engineering and mass production. Another central feature were the national pavilions, which were introduced at the Paris Exhibition in 1867. Peaceful competition between nations, instead of war, was the message. But it was also about displaying national characteristics and, later, attracting tourism.

Exhibitions were nothing new, however. An industrial exhibition was held in Stockholm in 1823, showing a total of some 500 objects. However, at the Art and Industry Exhibition in the same city in 1897, no one could count the tens of thousands of objects on display. A number of magnificent if mostly temporary buildings had been erected, including a miniature of Old Stockholm (in scale 1:2) to illustrate the Old Town as it looked in the sixteenth century – as a contrast to all the marvels of modernity – as well as the novelties of cinematography and X-ray technology. The press had its own pavilion – which was actually a press centre, catering to journalists – with telephones, typewriters, reading rooms, showers, and other facilities.

In general, these exhibitions sought to present a panoramic view of the new visual culture, educating visitors to *see* in the right way. Cinematographs and telephones, phonographs and typewriters, tables, diagrams, and other statistical representations, dioramas and wax figures, as well as X-rays were typically on display. Galleries, balconies, and belvederes offered visitors a panorama of modern civilization, while the privileged few were able to float above the city during hot air balloon rides. The Stockholm exhibition of 1897 is said to have had one and a half million visitors. It simultaneously spread to an even larger audience through various media, which at the same time were showcased at and documented the exhibition. It is therefore reasonable to describe these exhibitions as mass media. The number of visitors to the Paris Exhibition in 1900 is said to have been over fifty million.

## Audiovisual Media – About the Past



The notion that newspapers write the history of the present dates back a long way. In the nineteenth century the same idea came to be associated with photography, and later, with audiovisual media. In the summer of 1897, when *Stockholms-Tidningen* reported on the Lumière brothers' invention *le cinématographe* – a hand-cranked film camera that also worked as a film projector – the newspaper wrote that this “modern wonder” was like a time machine: “If we want to explore



ancient times, our choice is to either take up a spade or root through piles of scarce and yellowing papers. All future generations will have to do is turn the handle to see all life before themselves. Lucky them! We do wonder whether they will thank us for all that we are doing for their convenience.”

In the first decades of the twentieth century, audiovisual media were often viewed in terms of their documentary capabilities. Intellectuals in many countries pleaded for the creation of film archives – not as a means to save popular films (which were considered to hold negligible cultural value) but to save the moving images of real life that were captured by documentary film (a term from the interwar years). Above all, films came to be seen as a kind of visual evidence of a past reality. They were consequently used in court, most famously at the Nuremberg trials in 1945. Just a week after the Trial of Major War Criminals was launched against prominent military and political leaders within the German Nazi Party, the court screened a one-hour film titled *Nazi Concentration Camps* about the crimes against humanity that had been committed during the Second World War. Footage for the film had been recorded by Allied troops as they advanced through Germany in the spring of 1945. The edited footage was intended to document and bear witness to the terrible events that had taken place in the concentration camps.

The tribunal in Nuremberg was, however, prepared for the scenes since similar shocking film sequences had appeared in international newsreels in May 1945. A number of these appalling films are available today on YouTube, as is footage from British Pathé, an early producer of newsreels and films. In the Nuremberg courtroom, *Nazi Concentration Camps* was presented as proof of the crimes that had been committed, prompting the US prosecutor to declare that the film provided “overwhelming evidence” of what had occurred. In the first half of the twentieth century, moving images were not uncommon in court cases, but film had never before been used as graphic (and almost legally binding) proof of human atrocities and mass murder. The film even began with a textual certificate meant to display its authenticity, and the first title card stated that it was an “official documentary report compiled from films made by military photographers serving with the allied armies as they advanced into Germany.”

Yet this was a curious form of authentication, since as with all documentary films, close-ups, editing techniques, and voice-overs meant that the film presented *one* version of reality, which was open to many different interpretations. Departing from Friedrich Kittler’s media

theory, the films were also illustrative examples of so-called time axis manipulation, a distinctive feature of audiovisual media's relation to time. The most elementary experience in human existence is the irreversibility of the flow of time. But a media technology such as film provides a means for altering this irreversibility via editing.

The Trial of Major War Criminals and the twelve subsequent Nuremberg trials were as much a mass media event as a historical one. The trials were written about in newspapers and relentlessly photographed. Audiotaped recordings were broadcast on the radio, and newsreels of the trials were shown at cinemas. The opening trial is especially interesting because of the way audiovisual media were used to demonstrate what had actually happened during the war. These moving images of the past would both convince and corroborate that the horrors had occurred. Subsequently, the same images – from the war, the camps, and the trials – have been compiled into numerous television programs.

## The Media of the Masses



Before the latter half of the twentieth century the term *medium* had a much broader meaning than it commonly has today: media could, for example, refer to paper money, theatre stages, diplomats, and postal services; it could also refer to newspapers or people who could contact with the spirit world. In occultism, a spiritualist medium is the central figure during a séance, where disembodied voices are said to speak through the medium. As we observed at the outset, media are things that mediate, that connect sender and recipient. In that sense a spiritualist medium is a form of media, hinting at the problem of how to accurately define what a medium is. What can firmly be stated, however, is that technological ingenuity during the latter part of the nineteenth century led to the development of newer means of *mass communication*, primarily catering to large audiences: newspapers, the illustrated press, motion pictures, sound recordings, and later radio and television were consequently all *mass media*.

The media of the masses, however, triggered fears. From a socio-political perspective the masses (of people) were often perceived as a threat, at least for conservatives and the more affluent bourgeois. The way the masses used media thus became a cause for concern. In 1910 the Swedish philosopher Vitalis Norström published a book called *Masskultur* (Mass Culture). In it, he railed against the technical

and capitalistic changes then taking place, which he felt constituted a threat to humanity's very soul. Norström objected to "the intoxication of a merely superficial (technical) culture, that leaves the inner person empty and unsatisfied; to society's capitalist degeneration, which seeks to convert all of life's values into economic equivalents."

Norström's book is one in a long line of anti-modern publications from around 1900 that were preoccupied with the welfare of the masses, often symbolized by the urban working class. Some suggested that the actions of the masses reflected subconscious impulses within the population, while others feared how they could too easily submit to the suggestion and political control of a charismatic leader. The best-known book on the subject is French polymath Gustave le Bon's *La psychologie des foules* from 1895, which in the English translation that appeared a year later was called *The Crowd: A Study of the Popular Mind*. The book quickly sparked widespread debate; it was subsequently published in forty-five editions and translated into seventeen languages. Le Bon asserted that new so-called heterogeneous collectives (such as the working class) – in contrast to the naturally homogeneous collective of agrarian society – were modern crowds that could easily be influenced and indeed duped.

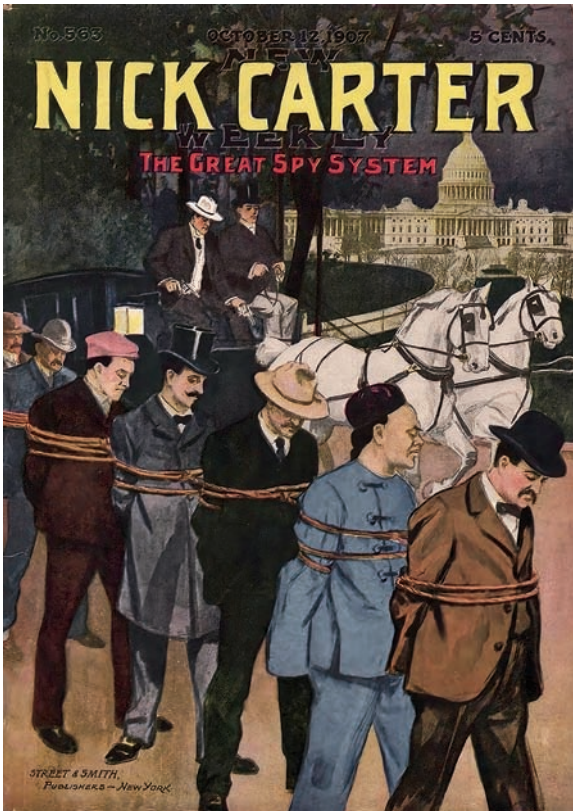
Psychologists and sociologists circa 1900 expressed their worries about "mass psychology" and how media usage appeared to bring out the very worst in humanity. On an ideological level, such views often boiled down to a fear of the working classes in general, as well as concerns about Western society's shift towards democracy. Suffrage was, for instance, a contentious issue; universal and equal voting rights for men and women were first introduced in New Zealand 1893 and in Australia in 1902. But in other countries progress was slow. Opinions about equal voting rights were for many years a recurring feature in the pro-workers' press, such as the German *Hamburger Echo* (launched in 1875) or *Vorwärts*, "Central-Organ der Sozialdemokratie Deutschlands," which started publishing in 1876 (and is still in print). The daily press was a crucial medium for the labour movement in Western Europe, and many of the leading figures within Social Democracy were newspapermen. Wilhelm Liebknecht, the principal founder of the Social Democratic Party of Germany, was a publisher of the party organ *Vorwärts*. By the early 1840s Karl Marx had been an editor and journalist at a number of European newspapers. The European labour movement nurtured a kind of textual media strategy aimed at raising the proletariat masses from the darkness of ignorance into the light of knowledge. The ruby red flag of the printing trade union Härnösands

Typografklubb, established in 1888 in northern Sweden, stated alongside a portrait of Johannes Gutenberg: “The printed word spreads light into the world.”

Intellectuals concerned with the media of the masses were more ambivalent. While Vitalis Norström’s criticism of mass culture was conservative and anti-capitalist, there was also a debate *within* the labour movement about how the masses were far too easily influenced. Mass media could thus have both positive and negative effects: the left-leaning partisan press was a way to stimulate opinion while other media commodities had a negative influence.

As we have seen, Western Europe had a distinctly partisan press by the end of the nineteenth century, particularly through the foundation of social democratic newspapers owned by party organizations, with left-leaning political content and party devotees as their main readership. These newspapers and their readers differed from North American journalism, where cheap, mass-produced, tabloid-style newspapers (the penny press) were catering to a mass audience. The era of the party press in the United States, when news editors received patronage from political parties, had reigned earlier, from the 1780s to the 1830s. Most American newspapers eventually became havens of serious journalism and objective newsgathering, as well as profitable powerhouses of advocacy, muckraking, and sensationalism.

In general, the media of the masses caused a reoccurring socio-political hesitancy and unease around the turn of the century. Moving images were one worry, pulp magazines and dime novels another. The fictional private detective Nick Carter first appeared as a serial in *New York Weekly* in 1886 – and then spread across the globe in a variety of media formats. Commercial mass media thus seemingly posed a risk of social or cultural breakdown. In addition, the partisan press owned by political parties was obviously not unbiased; it operated within a commercial market funded predominantly by advertisement but also voiced anti-commercial concerns (if the papers were left-wing). Sweden’s Social Democratic youth wing’s monthly publication *Fram*, for example, repeatedly attacked the detrimental effect of pulp fiction on children and young people, and indulged in raging tirades against “the evils of cinema.” The editor-in-chief at the time was future Swedish prime minister Per Albin Hansson (a Social Democrat): he was merciless in his criticism of popular culture and entertainment. In 1909, in one of many articles on the subject, he despaired that “5,000 kg of Nick Carter arrived in Sweden a few weeks ago, to be spread all over the country.” Hansson urged a boycott and a



During the early 1900s the Nick Carter character proved popular enough to headline its own magazine, *Nick Carter Weekly* – and the subsequent *New Nick Carter Weekly*. Nick Carter stories spread across the globe, and American dime novelist and pulp fiction writer Frederick van Rensselaer Dey is said to have written more than a thousand of them. [Wikimedia Commons](#).

“ruthless battle [so that] our youth are not systematically poisoned and led into a life of crime.”

Visual media in particular were associated with low cultural status – both among affluent society and within the labour movement. They were thought to seduce audiences into morally wrong, vain, and even dangerous ideals. Lurking in the background were fears of what would later be called *Americanization* – the idea that American culture (via mass media and, from the 1910s, Hollywood films) had a tremendous influence on domestic popular culture, politics, technology, and business around the world. At the same time, the popular mass appeal of the same visual media was spellbinding for audiences. It consequently became apparent that mass communication had a propagandistic value for political parties across the spectrum.

The history of propaganda is much older. The principles of propaganda – manipulating the content and dissemination of information to influence public opinion – have been used for thousands of years. For a long time, the notion of propaganda had more benign connotations:



to spread a message. The term *propaganda* derives from the Roman Catholic organization Congregatio de Propaganda Fide (Congregation for the Propagation of the Faith), founded in 1622 to carry out missionary work in non-Catholic countries. Nevertheless, mass dissemination of information to influence public opinion became a key characteristic of media after 1900. In his pamphlet *What Is to Be Done?* (1902), Russian revolutionary leader Vladimir Lenin argued that a strictly controlled party of dedicated revolutionaries was a necessity for the forthcoming revolution, where “propaganda” was an important tool for indoctrination together with “agitation” to exploit the grievances of the poor and uneducated, a technique Lenin called *agitprop*.

In order to reach the masses, the revolutionary left came to favour visual media. Eventually, even the smallest unit of the Communist Party in the Soviet Union had an agitprop section, where politics and aesthetics were often joined in astonishing ways. An example from the 1920s is the German illustrated magazine *Arbeiter-Illustrierte-Zeitung* (The Workers’ Pictorial Newspaper). It was a pro-communist magazine published between 1924 and 1938. The *Arbeiter-Illustrierte-Zeitung* featured a lot of photojournalism, with images often taken by the masses themselves, that is, common German workers, “Arbeiter-photographen.” The magazine, however, became best known for the ingenious, anti-Nazi photomontages of John Heartfield. He was a German visual artist and a pioneer in using photography as a political weapon. The photomontages by Heartfield – an anglicization of his German name (Helmut Herzfelde) and a personal protest against anti-British fervour during the First World War – account for *Arbeiter-Illustrierte-Zeitung’s* circulation of 350,000 copies in 1930. Three years later the magazine was banned, and all editorial staff had to flee Nazi Germany. The magazine continued to be published in exile, first in Prague and later in Paris.

Even in smaller (and more conformist) countries such as Sweden, the labour movement realized that the mass media of film and the illustrated press were so popular that they too needed to adopt these tactics. Given the popularity of such illustrated magazines as *Life* (re-launched in 1936 with the motto “to see life; to see the world; to eyewitness great events; to watch the faces of the poor and the gestures of the proud,” it soon reached a circulation of more than a million copies), a Swedish socialist started the similar *Folket i bild* (Picturing People), using the photographic medium to propagate and agitate for the cause of the labour movement. Contrary to *Life* or *Look* (which started in 1937), *Folket i bild* was positioned as an illustrated alternative devoted

to the common people, and free from royal celebrities and film stars: “For the glory of work, education, and entertainment – against bad taste, brown-nosing and diva cult!”

In the early twentieth century, views on the media of the masses ranged between fear and devotion. In the partisan press it was easy to control content. It therefore became important for political parties to own (or at least influence) other media channels. The guidelines for public service radio (and later television) drawn up in Western Europe during the interwar years were, consequently, often intended as a corrective against the supposed dumbing-down of American programming. Generally speaking, this was something that both conservative and social democratic governments could agree on. The first general manager of the BBC, John Reith, repeatedly stated that public service broadcasting must be a cultural, moral, and educational force aimed at improving “knowledge, taste and manners” among the working class.

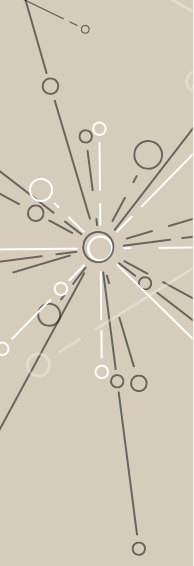
Mass media thus needed to be used, but at the same time tamed – similar to the way the economic market should be regulated – which perpetuated the ambivalence of the elite towards the masses and their media. Perceived from a media historical perspective, the leap from the seductive Nick Carter magazines, the evils of early cinema, or le Bon’s duped heterogeneous collectives towards media-saturated debates about video violence in the 1970s and ’80s, is not particularly great. The same concerns have been expressed again and again, regardless of the form mass media take. Moral panic has been a recurring response to twentieth-century mass media. Film was considered a particularly sinister medium; a film censorship committee based in Chicago was founded in 1907. Other countries followed suit. From 1912 the British Board of Film Censors was responsible for the national classification and censorship of films exhibited at cinemas, and in Ireland film censorship began in 1923 with the Censorship of Films Act. In Sweden censorship of films started in 1911 and did not end until 2010. Today public anxieties relate more to screen time, the ever-expanding availability of media content, and its damaging effects on young people. But the point is that the moral indignation that mass media caused in the twentieth century persists, including demands for content of higher quality. Across most countries in Western Europe, policy on media and culture followed a similar trajectory in the second half of the twentieth century. National cultural policies usually stipulated that their central aim was to combat the negative impacts of American commercialism, in both culture and the media. Underlying ideas were often paternalistic; the masses needed to be protected from

content that could lead them astray and brutalize them. Half a century later, these perceptions and warnings sound familiar.

The modern mass media that became widespread in the twentieth century are commonly considered to be the daily and weekly press, magazines, radio, television, books, photography (mainly in printed publications), video, and recorded music (in the form of vinyl records and cassettes). The definition covers media forms in several different modes – text, sound, still and moving images – but, above all, in mixed forms such as sound film or illustrated print forms. News, for example, was already being spread in all these modes by the early 1900s: in text and images in the daily press, in newsreels at the cinema, and via sound on the radio. The transmission of news also used the telegraph, telephone, and teleprinter – the same technologies that launched the international news agencies from the mid-nineteenth century.

News agencies operated on a global market, but as a rule, twentieth-century mass media were nationally oriented. With the exception of film and recorded music, which had an international flavour from the outset, most newspapers as well as public service broadcasters were national endeavours. However, some major public services – foremost the BBC – were also broadcasting to an international audience, including the colonies in the British Empire. Mass media enabled people to keep up to date on both news and culture, while at the same time serving up relaxation and entertainment – whether culturally refined or of a more popular leaning.

Compared with earlier periods, the media of the twentieth century became more and more commercially oriented and aimed at a mass market. Scope and scale set this mass media era apart from previous media history. However, the most widespread media were not exclusively commercial in the twentieth century since state-funded (and state-regulated) public service broadcasters often reached millions of listeners or viewers – and sometimes more. The British Broadcasting Corporation, which was created in 1922, is usually regarded as the model that other countries followed. With a monopoly on radio and television in Great Britain (until the mid-1950s), the BBC influenced broadcasting in many countries. The early BBC was typically highbrow and cultivated, even scholarly; director John Reith's mandate was to educate and inform, as well as to (sometimes) entertain. British radio audiences hence had little choice besides the upscale programming of the BBC, and Reith ferociously resisted the US commercial radio model. He detested the American-style free-for-all radio that tried to lure the largest audiences in order to secure advertising revenue.



## Media Archaeology | WOLFGANG ERNST

“History is written by the victors” is a quotation sometimes ascribed to Winston Churchill. But what happens to those who lose? Media history, for example, is littered with media forms and technologies that proved neither popular, functional, nor called for. Phonographs, zogra-sopes, and megalethoscopes are all forgotten media. Yet even media without a future can be interesting. History is not a continuous and linear progression but is filled with detours and dead ends. Media archaeology specifically chooses not to study media history as teleological and fit for purpose. Instead, a media archaeologist such as Germany’s Wolfgang Ernst seeks to dig up lost media that were once innovations and, just like a (real) archaeologist would, unpeel the past layers of media technology. At the Humboldt-Universität zu Berlin where Ernst works, he has even set up the Media Archaeological Fundus, an extensive collection of old and forgotten media devices.

Within media archaeology, material devices stand at the centre of attention. Media archaeology looks to reveal the agency of the machines themselves – not how people used them. Drawing on Friedrich Kittler’s media theory and its exploration of media recording systems that store, process, and transfer information, media archaeology stresses that technology and new technical achievements have always controlled culture. For media archaeologists such as Ernst, all archives, libraries, and repositories of cultural output are always *media archives* – full of handwritten documents, printed books and newspapers, chemical-mechanical media such as photographs and films, electrical media forms such as radio and television, and digital media.

In other words, media archaeology digs beneath the archive’s remnants by paying attention to the mediated conditions that underpin them. All forms of media affect their content in specific ways. Media archaeology is therefore focused not on interpretation and meaning, but on the media devices themselves – all of which are inscribed in a “historical a priori” (Kittler). That is, the objects found in an archive are always media first, and historically discursive thereafter. Media archaeology therefore highlights the mediality of discursive systems. It might sound complex but simply pinpoints the need to examine how different media technologies through history (and in the present) have organized various expressions of culture: the technical limitations of the Lumière brothers’ *cinématographe* meant that their films were never longer than fifty seconds, Twitter currently allows only 280 characters, and so on. The medium governs the message.

Media archaeology has been accused of being technologically deterministic, if not obsessed. The charge is that Ernst and his colleagues are machine-fetishist reductionists who have forgotten that media still need subjects and user practices in order to generate any kind of meaning. And there is something in such a criticism. Nevertheless, media archaeologists currently examining digital media in fields such as software studies place technology front and centre for good reasons. A digital focus on technology has to some extent proved the media archaeologists right, since it is increasingly necessary to dig into the medium – down to code level – to fully understand how digital media work.

(Later, Reith is said to have hated the idea of television – but allowed its development.)

Public service broadcasting of radio and television were established worldwide from the mid-1920s to the 1950s: the Tokyo Broadcasting Station was founded in 1924, the Danish Broadcasting Corporation in 1925, the Icelandic National Broadcasting Service in 1930, the Bulgarian National Radio in 1935, the Canadian Broadcasting Corporation in 1936, Radiodiffusion française nationale in 1939, and Argentina Televisión Pública in 1951. The pattern was clear: most nations saw the benefit of mass media that were free from advertisements. Hence, public service broadcasting was usually perceived as an alternative to the commercial mass media that operated in an open market. Yet, the differences should not be exaggerated. When Swedish public service television was introduced in the early 1950s, one of the first series to be broadcast was the popular US comedy *I Love Lucy*, which featured a great deal of smoking, since the series was sponsored by the tobacco giant Philip Morris. The tobacco ads were omitted in the Swedish broadcast, since there was consensus among politicians across the spectrum that public service broadcasts should be free from advertising. At the same time, the daily press and magazines in most countries in the 1950s were packed with all sorts of TV-related ads, in which the new medium was linked to a host of products and associated with domestic living and an American lifestyle.

Media scholars usually assert that mass media communication – as in the form of public service broadcasting – should be considered separately from other communication, such as a conversation between two people. Mass communication is often said to be *indirect* because the sender is removed from the recipient in time or space. Mass communication is also generally unidirectional and public, transmitted from one to many, making it unclear who precisely receives the messages. But it is also simultaneous, as many people are reached at the same moment in time. Many twentieth-century mass media forms demonstrate these characteristics, though not all of them. Yet, the media history of the twentieth century was very much about the formation of mass audiences that consumed popular media forms such as the press, film, radio, and television. Appealing to mass audiences was a way to make money – partly through advertising and partly through the audience's willingness to pay for a newspaper, an illustrated magazine, or a movie ticket.

If BBC-inspired public service broadcasting catered to a more discerning audience, or at least imagined its listeners and viewers in this



way, the medium of film was wholeheartedly a commercial enterprise. One of the inventors of moving pictures, Louis Lumière, reportedly said that the cinema was an invention without any future, yet by 1910 there were more than 600 cinemas, known as *nickelodeons*, in New York and 300 similar *Kintopps* in Berlin. Early cinema (before Hollywood) was a cheap working-class entertainment with a modest ticket price. Cinematic modernity was, however, primarily a Western phenomenon. In 1910 there were only eight cinemas in the vast metropolis of Istanbul, the Syrian city of Aleppo had no permanent cinema before the First World War, and around 1920 there were only fifteen or so cinemas across the whole of Egypt – while at the same time, Germans were buying two million movie tickets every day. Just a few years later, Germany boasted more than 5,000 cinemas with a capacity of two million cinemagoers. In 1938, 250 million French people went to the cinema, and over the next year British cinemas welcomed twenty-three million visitors – each week. Movie culture spread far and wide as Hollywood films conquered the world, and the launch of sound films (“talking pictures” or “talkies”) in the 1930s further established English as the global lingua franca – a trend that would increase with American rock ‘n’ roll and TV series as well as British pop music during the postwar years.

After the Second World War, dubbed films and television programs became common in many countries. The history of dubbing has a fascinating geography that says a great deal about how language skills have spread (or rather the opposite, as dubbed media reduced the availability of media in languages other than one’s own). Dubbing involved recording a new version of the soundtrack for a film or TV series to serve the language preferences of a particular regional market. Most countries in northern Europe retained the system of the silent movies’ (translated) title cards, and later practically all foreign films and television programs in these countries came to be subtitled (except those aimed at children). In central and southern Europe dubbed films became the standard, even though dubbing was far more expensive than subtitling. In Germany, for example, Hollywood stars often had their own distinctive “voice”; becoming a *Synchrosprecher* was a lucrative sideline for German actors. Eastern Europe and the Soviet Union also dubbed foreign films and television programs (as long as they passed the Communist censors) but here the dubbing was mostly done with just a few actors – the voices of the original actors could still be heard in the background. Although a Hollywood film’s (visual) story was the same wherever it screened, these nation-specific translations

meant that a film could be understood in slightly different ways. Conversely, cinema audiences in Germany found nothing strange about the fact that John Wayne spoke German.

## Mass Media as an Industry



Just as print culture and the daily press had done, cinema and later radio contributed to the formation of national identities. In the decades after 1900, people demonstrated a longing for news and entertainment (and to some extent for education). As people's disposable income increased, media offerings proliferated in response to this demand. To prospective media entrepreneurs, the mass market for content appeared almost endless – fortunes could be made.

As we have seen, newspaper production became an industry in the mid-nineteenth century. The production of other media followed suit, as image, sound, and film production rapidly grew from artisanal craft to full-blown media industries whose content was distributed internationally. While around 3 million daguerreotypes were manually photographed and sold in the United States in 1853, half a century later the company Underwood & Underwood was producing around 25,000 stereoscopic images daily – a technique for creating an illusion of depth via two images. Around the same time, Edison had manufactured half a million phonograph cylinders, or records (on 3,000 different topics), the British Sunday newspaper *Lloyd's Weekly News* reached a circulation of more than one million, and daily American publications such as *New York World* and *New York Journal-American* enjoyed similar sales figures. In 1902 the French film company Pathé Frères established a vast production facility outside Paris where films were produced on an assembly-line basis.

The emergence of modern society and industrial civilization, which gradually made living conditions and economic prospects a bit brighter for ordinary people in the Western world, created a consumer market for industrially produced media products. Media and modernity reflected each other and were also fused together through the media industries that arose. In general, the mass media of the time were both a cause and effect of the socio-cultural changes that modernity brought forth. They were indeed a real threat to “traditional values,” as Vitalis Norström had feared.

In Norström's wake stands a long line of philosophers and sociologists who have identified mass media as a force for what has been

called modernity. As the traditions, culture, religious beliefs, and social rules of agrarian society ceased to be the norm – the disenchantment of the world, *die Entzauberung der Welt*, as sociologist Max Weber famously dubbed it – such cornerstones were gradually replaced by secular ideals, urbanization, rational bureaucracy, and mass media. This Weberian view has since been challenged; the disenchantment was never especially total. Nevertheless, modernity “lived in the future rather than the past,” to quote sociologist Anthony Giddens. Media modernity re-formed society, not least in the way that media use became an integral part of an increasingly urban industrial society.

We have referred already to the American “penny press,” with its mass-produced, tabloid-like newspapers that cost literally a penny. Small coins and media were often linked. In fact, the history of the press begins with coins. In Italian, the word *gazzetta* is used for newspapers – for lovers of Italian football the pink pages of *La Gazzetta dello Sport* are a must-read – but a *gazzetta* was originally a Venetian coin. In mid-sixteenth-century Venice, the very first single-page newspapers (which were often handwritten) cost one *gazzetta*, hence the name. A cheap newspaper thus became synonymous with a coin. France’s first newspaper was called *Gazette de France* (1631) and Portugal’s was *A Gazeta da Restauração* (1641).

Coins and media are sometimes considered to be interdependent; the penny press and nickelodeons are two examples; dime novels are another. A penny is the name of a one-cent coin, a nickel is a five-cent coin, and a dime is a ten-cent coin. This was small change that even wage workers could afford, which suggests that dime novels, nickelodeons, and the penny press were all industrially mass-produced media aimed at the masses. The use of small coins as a metaphor is telling, but also had a pejorative connotation. Literary serials in the nineteenth century had many such disparaging names: *penny dreadfuls* and *shilling shockers* in Britain, *Groschenromane* in Germany, and *livraisons à dix centimes* in France. Sweden followed a similar pattern with *billighetsböcker*, referring to newsstand reading for poor people. Most of the titles were adventure stories by authors such as Jules Verne and Arthur Conan Doyle, but the works of more celebrated literary authors were also published in such series.

Industrial media production clearly put pressure on prices. But while large-scale newspaper production was the first true media industry – initially in the UK and the US, and then in a number of countries in Western Europe – its success was driven as much by steadily increasing literacy rates as by affordable prices. In the United States

and western Europe, 80 to 90 per cent of the population were able to read by the start of the twentieth century, a figure that created a significant demand for cheap newspapers, magazines, and books. Once again, the history of media is usually written through a rather one-sided, Western lens. But with literacy rates of below 10 per cent in Africa, the Arab world, India, and Southeast Asia until as late as the interwar years, there was not a substantial reading public to sustain a newspaper or book market in these colonized parts of the world. In addition, many places had repressive press legislation – both religiously and politically motivated – that stifled the few attempts to establish newspapers. “Censorship and self-censorship made their way gradually along with the development of Ottoman print culture,” as historian Milena B. Methodieva has written.

Literature and news would, however, reach those unable to read via oral recitations. People would often listen to others reading aloud at teahouses, in public squares, and at factories – a reminder that media history usually involves a lot of residual media still prevalent in society. Perhaps the best-known example are the Cuban *lectores* who were paid to read out world literature and newspapers to workers as they rolled cigars, a media practice dating back to the early nineteenth century. Some books were so popular among workers that bundles

Media and tobacco. The daily newspaper as a factual mass medium: a *lectore* reads aloud to Cuban tobacco workers around 1900. University of South Florida Special Collections.



of Havana cigars began sporting the names of characters from literature: Don Quijote, Romeo y Julieta, and Montecristo are all still brands of Cuban-style cigars. The custom of *lectores* was also established in Florida – and not without ideological repercussions. At cigar factories in Tampa in the 1920s, workers would give twenty-five to fifty cents of their weekly salary to elect a fellow workman to act as a *lector*. He would then read aloud from books and newspapers, and (sometimes) left-wing radical publications such as *The Daily Worker* or *Socialist Call*. Factory owners became hostile to them, claiming that *lectores* were prone to communist ideology and “the reading of red-hot radical publications and anarchistic propaganda, with the result that widespread unrest developed among the cigar workers,” according to the *Tampa Daily Times*. After a strike in 1931, *lectores* were banned, or as one newspaper stated: “In the past, manufacturers had entered into an agreement with workers, allowing the reading of educational or instructional information, articles, or books, but the abuse of this privilege [has now led manufacturers not to] allow readers to read anything in the factories.”

The practice of *lectores* and reading aloud at factories was still prevalent in Cuba after the year 2000. It is worth noting that non-Western media history often presents a different chronology. Low literacy rates, for example, meant that the breakthrough of the daily press came much later, and the same is true for other forms of media. The Nigerian film industry – the largest in Africa, sometimes called Nollywood – did not emerge until after Nigeria’s independence in the 1960s. African media history is closely bound up with the colonization of the continent. Telegraphy and radio were media that the colonial powers quickly invested in because they were vital for controlling their territory. Other media took longer to develop; African television didn’t become widespread until after 1975. Colonial powers suppressed local media development, and often acted as owners. The *Nigerian Daily Times*, which was first published in 1925 and quickly became one of the continent’s leading newspapers, was usually controlled by Westerners. Nevertheless, colonial daily newspapers attracted African readers, as did the missionary publications of the free church. Yet an alternative and anti-colonial nationalistic daily press also slowly developed, sometimes in secret. In British West Africa alone, 227 different daily newspapers were published during the colonial period. Although these newspapers came to play a central role in the decolonization and independence struggles of the postwar years, foreign media ownership remained significant. Even if many African countries became formally



free and independent during the 1960s, they were still dominated by Western media, which provoked protests and state interventions. The *Nigerian Daily Times* was consequently nationalized in 1975 – after which its popularity plummeted.

The dependence of the daily press on external capital was the main reason why (rich) owners from the West came to dominate newspaper production in Africa. The development of the press took off in the late nineteenth century in the United States and western Europe, where industrial-scale production made the newspaper industry increasingly capital-intensive. To be able to produce large print runs, traditional newspapers needed to invest in both printing and distribution. This required substantial financial capital, which in turn brought economic changes to ownership structures, including newspaper syndicates and stock-market flotations. As daily press circulation expanded, so did the advertising market. Combined with new types of printing presses and typesetting machines that made newspaper production cheaper and more efficient, ownership of newspapers gradually became a lucrative business. In the United States, this trend produced media moguls such as William Randolph Hearst, whose titles attracted millions of readers with popular – and often populist – journalism covering topics that appealed to the masses, such as sport. The latter is a case in point: as American sports grew from a regional pastime to a national industry, sports journalism developed in tandem into a profession with its own norms and values. The sportswriter Henry Chadwick – sometimes nicknamed the Father of Baseball (he was a baseball statistician too) – was one of the first fully fledged sports reporters, writing in the weekly entertainment newspaper *New York Clipper* in the 1850s and '60s. In 1883 the *New York World*, owned by another newspaper magnate, Joseph Pulitzer, became the first daily North American newspaper with its own sports editor.

Sport and media coverage of sport entered into a mutual relationship, not just in print but in visual media as well. Boxing matches were among the first subjects of the Edison Kinetoscope, such as the early motion picture *Corbett and Courtney before the Kinetograph* (1895). A few years later the British cinematographer (and local football fan) Jasper Redfern toured with his team Sheffield United and filmed *Sheffield United vs. Liverpool* (1899), as well as additional cup matches, including the Football Association Cup Final, *Sheffield United vs. Derby* (1899). Redfern was pleased: Sheffield won, 4–1. In the US, film companies such as American Mutoscope and Biograph covered basketball, motor racing, athletics, and yacht races. Films of the World Series in baseball

were especially popular, and “demonstrated increasing camera coverage and editing prowess to produce films of dramatic tension and evident sporting prowess,” according to film historian Luke McKernan. After 1910, sports footage was regularly featured in newsreels. A team of six cameramen from the French company Pathé Frères filmed the Olympic Games at the Stockholm Stadium in 1912. There was money to be made, as Pathé had secured exclusive rights to produce “Olympic films” for the global market. Some ten years later, radio broadcasts naturally took on sports as well. Sports commentators, or so-called play-by-play broadcast announcers, soon became famous for their quick talkative style – particularly in fast-paced sporting events like ice hockey. In the 1920s, the Canadian radio broadcaster Foster Hewitt became known for his crisp style of reporting a goal: “he shoots, he scores.” For forty years, Hewitt was Canada’s premier play-by-play announcer on the show *Hockey Night in Canada*, and he always welcomed radio listeners in North America with the same phrase: “Hello, Canada, and hockey fans in the United States, and Newfoundland.”

The Canadian petroleum company Imperial Oil was the main sponsor of *Hockey Night in Canada* in the 1930s and '40s. Sports was business, and during the first part of the twentieth century a symbiotic relationship developed between the growth of sports and media in general – first in print and later in broadcasting. The daily press reported on games and matches on their sports pages (and sold copies of these papers), which in turn gave sports events a higher profile and made them more popular (which attracted paying spectators). It proved a largely frictionless partnership, although the growth of broadcast media such as radio and television, with their capacity for live and direct reporting, risked undermining this relationship. For commercial radio and television this was not a problem – it was a question of money. For public service broadcasting, however, the issue was more delicate. When, in 1954, Sweden once again played host to the Ice Hockey World Championship, the competition was preceded by a dispute between Swedish public service radio and the Swedish Ice Hockey Association. The latter feared that radio coverage would negatively affect ticket sales, and the issue was only resolved after protracted negotiations.

In today’s increasingly deregulated and global media landscape conflicts such as in 1954 no longer cause a problem, since sports media rights have developed into a sophisticated business of its own (no doubt prompted by other wrangles). The rights to broadcast sports events are among the costliest in the media industry. FIFA, the

international football association, sold the media rights for the World Cup matches in 2018 and 2022 for US\$2 billion.

The second half of the nineteenth century saw a jump in both the number of daily newspapers and their circulation across the Western world. Although the press and its hacks were constantly digging for news, and journalists were keen on cultivating an image as professional truth seekers, it became apparent that the mass media sometimes *produced* news in order to keep both audiences and advertisers happy. Later, media theorist Marshall McLuhan suggested that the key contribution of the daily press was to create an image of modern society as a series of events. “Long before big business and corporations became aware of the image of their operation as a fiction to be carefully tattooed upon the public sensorium, the press had created the image of the community as a series of on-going actions unified by datelines.” The press indeed stood out as a combination of diverse elements, a mosaic that could increase social problems – some writers and intellectuals regularly described journalists as hopeless losers and liars with no moral character.

In 1909, more than 2,500 daily newspapers were published in the US. And in the 1920s, even a small country like Sweden had 235 newspapers that came out at least twice a week – a peak that has never been achieved since. Weeklies and satirical magazines were widely read and discussed. The illustrated press was a particularly popular mass medium that grew increasingly after the turn of the twentieth century. In Germany, *Berliner Illustrirte Zeitung* was launched in 1891, and during the interwar years it reached a weekly print run of three million copies. Such image-packed weekly magazines also began to be published for more specific markets, especially female readers. The Swedish *Idun* sought to be a weekly magazine for women and the home, and in its first issue in 1887 declared “we aim to make our magazine of real practical use for women and the home, and to be a true unifying force for families.” The model was provided by the British title *The Lady* from 1885 and *Ladies’ Home Journal* from 1883 in the US, both women’s magazines that remain in print today. It was easy to criticize this type of apolitical women’s magazine, not least from the perspective of the labour movement, though some women’s magazines were early advocates of women’s suffrage.

Media philosopher Friedrich Kittler uses the German term *Medien-gründerzeit* to describe the period before 1900, a media-founding period, since these decades saw the emergence of different types of analog mass media industries with a focus on sound and moving



In 1903, *The Ladies' Home Journal* was the first American magazine to pass one million subscribers. It has often been regarded as a pioneer with its mix of ads and popular content focusing on fashion and family life. Wikimedia Commons.

images. The American inventor Thomas Edison created the phonograph in 1877, a small machine for recording and reproducing sound. Some years later, another inventor, Emile Berliner, launched the gramophone. Yet they were preceded by French printer and bookseller Edouard-Leon Scott de Martinville, who took out a patent for the phonautograph back in 1857. Martinville had a bookshop in Paris and, through various printed publications, had considerable knowledge of photography. His skills provide a hint of media connections of the day: if it was possible to reproduce images mechanically, shouldn't it also be possible with sound? Martinville's phonautograph was a mechanical device that, with the help of a needle, recorded sound waves on a soot-blackened, rotating cylinder. Sound was thus documented over time – but unfortunately could not be audibly recreated. Then again, as a printer interested in photography, and working with recorded sound, Martinville is an apt example of how different media modalities need to be understood in relation to one another.

Digital technology has recently made it possible to reproduce the phonograph's old recordings. The barely audible French folk song "Au clair de la lune" from April 1860 is today the world's oldest recording of a human voice. Martinville is therefore an interesting figure: failures and shortcomings also have their place in media history. The now-forgotten phonograph supports the argument that mechanical technologies (such as the phonograph and gramophone) were technologies first, then media. The key was to tempt people to use them as media, as both Edison and Berliner realized. There was a commercial imperative to turn a technology into a popular media form, since only then could you begin to make money.

The phonograph and gramophone were both mechanical media that stored sound on a rotating cylinder or on a rotating shellac disc. The sound quality was initially terrible, but the wind-up mechanical phonographs and gramophones nevertheless spread around the world as a new must-have technology. Both Edison and Berliner tried to increase the popularity of their inventions (hardware) by setting up companies to record and market phonograph cylinders and gramophone records (software), a business pattern that recurs later in media history. Edison was as much an entrepreneur as he was an innovator, while Berliner Gramophone and its British subsidiary The Gramophone Company – with the His Master's Voice logo of a dog listening intently to a gramophone horn – became a household name. Gramophone records were easier to reproduce in disc presses and therefore came to dominate the emerging recording industry. Already in 1904, Italian tenor Enrico Caruso made a recording that sold more than a million copies. The early music industry at first avoided paying royalties, however, unless a musician was already well known. In 1909, a copyright law was passed by the US Congress that forced companies to pay royalties from record sales to songwriters and publishers (but not to performers). Caruso is said to have made at least US\$5 million from record sales, getting \$4,000 per song recorded – plus a staggering forty cents in royalties per record, at the time when the price of one recording was around a dollar.

Not all artists and musicians were in favour of so-called canned music, however. In 1906 the American composer and conductor John Philip Sousa – known primarily for patriotic marches such as "The Stars and Stripes Forever" – famously claimed at a congressional hearing on the status of the forthcoming copyright law that recorded music and "these talking machines are going to ruin the artistic development of music in this country. When I was a boy ... you would find young





Mass media such as the phonograph were not only aimed at a consumer market; they were also used for archival documentation. In 1916, American ethnologist Frances Densmore recorded the Blackfoot Indian Mountain Chief and his tribe's songs with the help of Edison's phonograph. The recordings – about two to three minutes long due to the length of the phonograph cylinder – took place at the Bureau of American Ethnology at the Smithsonian Institution in Washington. However, Mountain Chief likely did not perform in his Native American dress – the photograph is probably staged. Through media, one can both document and distort reality. A later generation of folklorists sometimes also missed the media-specific conditions of these audio documents; to them, it was astonishing that all the Native American songs seemed to be three minutes long. Library of Congress, Washington, DC.

people together singing the songs of the day or old songs. Today you hear these infernal machines going night and day.” Sousa held a very low opinion of the recording industry. Until the 1920s, the music business was dominated by song publishers and vaudeville theatres – not record labels. Sheet music still outsold records; hence most of the

music heard in homes or in public settings was played by people, and not by “infernal machines.” In fact, recorded versions of popular songs were often released only after sheet music sales began to drop.

Then again, during the interwar period the commercial record industry grew rapidly. Jazz music became an international phenomenon in the 1920s due to recordings. The music industry also increasingly focused on various strands of youth culture, from the swing fans of jazz and devotees of 1940s dance halls to the rockabillys of the early 1950s. As with sport, a rivalry grew between record companies and the radio. It reached a climax in the Great Depression of the 1930s when American record companies blamed their declining sales on the availability of free music on the radio. In the US, the conflict was resolved through new laws guaranteeing record companies (and sometimes musicians) a certain amount of money per minute on the radio. Over time, a symbiosis developed, whereby radio became the record companies’ main channel for marketing their products. Increased popularity of so-called hit songs boosted radio’s ability to sell advertising. In the US, the Honour Roll of Hits was established in 1945, to be replaced ten years later by the less scholastic-sounding Billboard Top 100, a popularity record chart based on sales and radio plays. As an analog sound storage medium, the LP – long playing or long play – was introduced in 1948, and the first 45-rpm (revolutions per minute) single went on sale a year later. But it was in the 1960s that the record industry made its huge commercial breakthrough across the Western world, with pop and rock music creating an enormous market for the music industry, pushing the value of record sales tenfold in the US alone. Figures vary, but the Beatles’ *Sgt. Pepper’s Lonely Hearts Club Band* is said to have sold at least thirty million copies during the 1960s.

The symbiosis of hardware and software would also advance the early twentieth-century film industry. While the motion picture industry later came to be dominated by five major film studios in Hollywood, the groundwork was laid in France, when phonograph seller Charles Pathé decided in the 1890s that moving images could be turned into a commercial success. In the period before the First World War, the film company Pathé Frères developed into the world’s largest producer, distributor, and exhibitor of film, through permanent cinemas and affiliates the world over. Before the term even existed, Pathé Frères implemented vertical integration, where one company owned all the steps in the production process, from raw material to sales or screenings of the end product. Pathé Frères was a true pioneer in the media industry – thus establishing a prototype for Hollywood – by



“A la conquête du monde.” The brothers Charles and Émile Pathé conquered the world with their media – in a 1906 poster painted by Adrien Barrère. Wikimedia Commons.

simultaneously involving itself in film production and cinema ownership, film distribution and film rental, laboratory services and the manufacture of cameras and film projectors. The company was also an early exponent of a kind of cultural globalization, where practically the same films were screened in Moscow, Tokyo, Paris, and New York.

Film historians usually assert that the groundbreaking nature of Pathé Frères paved the way for the glamorous Western, and predominantly American, lifestyle ideals and attitudes that gradually became a kind of global norm. With its attractive *star system*, Hollywood adopted the same kind of “soft power,” to use a term later coined by political scientist Joseph Nye. Yet this form of cultural globalization and import of Western ideals should not be overstated. All early films were made up of different acts – governed by how much celluloid a film reel could hold – making it possible to have alternative final acts. Russians loved a tragic ending, for instance. Early Japanese cinema was more unusual, since up until the 1920s each auditorium would have a *benshi*, a narrator, giving a running commentary on the silent story playing out on screen. Sometimes several *benshi* might perform on the side of

the film screen, acting out dialogue between different characters. In addition, practically all silent films were accompanied by musicians, who improvised on the piano. Although the same (or very similar) Pathé films were sent and seen all over the planet, the way that they were shown and interpreted varied.

The First World War left Pathé Frère's film empire in tatters, and by the time the war ended, the Hollywood film industry had begun to dominate the international market. The increased popularity of Hollywood films changed people's view of the world, influencing millions of

In 1925 Swedish actress Greta Gustafsson left Stockholm for Hollywood – to become Greta Garbo. In May 1928 she was the poster girl for *Photoplay*, one of the first American film fan magazines, with a growing circulation fuelled by the public's increasing interest in the private lives of celebrities. Media History Digital Library.

During the interwar years, Hollywood film productions conquered the world – not only in Europe but also in Asia. One of the first full-length animated feature films was Walt Disney's *Snow White and the Seven Dwarfs* (1937), based on a fairy tale from the Brothers Grimm. Korean Film Archive, Seoul.







## *The Medium Is the Message* | MARSHALL MCLUHAN

The self-contradicting idea that “the medium is the message” was launched in Canadian media theorist Marshall McLuhan’s *Understanding Media: The Extensions of Man* in 1964. In a play on the phrase, a later book was called *The Medium Is the Message: An Inventory of Effects* (1967). The statement means that a medium’s form is always embedded in the message conveyed by the medium “massaging” our understanding. The form affects our understanding of the content. In fact, it is more than that: media shape our perceptions and values. There are no transparent and neutral channels of transmission. These technologies are directors of our sensory impressions, creating frameworks for our thoughts and behaviours.

McLuhan was trying to understand the perceived shift in his own time: the transition from print-based to electronic communication. And he indeed sang the praises of these new media. Book culture was inward-looking and individualistic, while new media had the potential to bind the world into a “global village.” The effects that McLuhan ascribed to different forms of media are open to debate, to say the least, as are his interpretations of history. But that does nothing to diminish the groundbreaking nature of the theoretical revolution he inspired. The focus was now placed on the *formal properties* of the media, where (almost) all previous research had been aimed at the *meaning* of what was being transmitted. Propaganda research of the interwar years had, for example, analyzed

the messages being disseminated, but almost entirely ignored *how* they were spread. But media studies should of course focus on the forms of media; the success of Nazism cannot be understood without considering radio’s capacity to convey a single person’s voice to millions of listeners – the medium was the point, the actual message. The effectiveness of Nazi propaganda rested not on *what* the Führer said, but on *the fact that* his voice reached everyone over the airwaves.

The innovative aspects of McLuhan include his broad understanding of what media are, namely human expansions or bodily extensions. And so, the light bulb becomes an illustration of “the medium is the message.” It has no content in the way that a TV has programs. It is purely a medium without content. However, it has social effects by enabling the creation of spaces that otherwise would have remained in darkness – “a light bulb creates an environment by its mere presence.” His ideas became most controversial when McLuhan took them to their logical extreme, claiming that the content of media had very little effect on society. It didn’t matter whether television broadcast children’s shows or violent programming; the effect on society would be the same.

McLuhan is not easy to read. He is associative, sprawling, and speculative, not to say verbose and unfocused; he deliberately cultivated a “mosaic approach.” But if you sit with him long enough, you will see the world in a new way. As such, the form will influence your understanding.





The best film ever made? The style B theatrical poster for the American release of Orson Welles's 1941 film *Citizen Kane*. Wikimedia Commons.

people's fantasies, male and female ideals, and erotic desires. Within the Hollywood studio system, the concept of the Big Five became established in the 1920s, with 20th Century Fox, RKO Pictures, Paramount Pictures, Warner Bros, and Metro-Goldwyn-Mayer carving up the market between them. During the interwar period Hollywood films became the most successful industrially produced mass media product in the world. Given the dominance of American movies, cultural critics in other Western countries were often concerned about pervasive Americanization. Youth culture was by far the most Americanized, and of the most concern, but the wider public also fell under the same influence, at least according to worried writers and politicians. However, it should be remembered that Hollywood's studio system not only produced what European critics considered to be substandard products; while film was primarily an industry designed to attract a mass audience and earn money, this did not prevent the production of

a number of excellent films – some of them even critical of the media industry. Orson Welles’s portrait of newspaper magnate William Randolph Hearst in *Citizen Kane* from 1941, produced by Warner Bros., is often cited as the best film ever made.



## Mass Media as Politics in the Twentieth Century

During the early twentieth century contemporary mass media were often associated with a range of idealistic ideas that fired the imagination. When Swedish radio commentator Sven Jerring first heard a radio broadcast in 1923, for example, he felt he was experiencing “the birth of a new world.” Radio and the “flying machine” would bring about a global renaissance, he thought: “they would shrink distances and banish the ignorance to which all splits and all controversies between nations could be traced. Finally, people would get to know each other.” Such utopian ideas had been associated with telegraphy and telephony, and would later be associated with media forms such as television, the internet, and social media. Yet, as a quintessential modern technology, broadcast radio stood out as a medium without borders. In the 1890s, Italian inventor Guglielmo Marconi had conducted experiments exploring the possibility of sending signals over longer distances. This was why radio was initially referred to as wireless telegraphy, and just like Edison and Berliner, Marconi successfully monetized his technology. Marconi’s Wireless Telegraph Co. dominated maritime radio telegraphy up until the First World War.

Not unlike the telegraph during the American Civil War, the use of radio had a profound effect on the First World War. Radio communications became a strategic weapon for all opposing armies, and the war also established the concept of signal intelligence. The interception of enemy radio traffic became a way of discovering critical information. Even if code and cipher systems were used to transmit secret high-command and tactical communications, signal intelligence was sometimes able to intercept these as well. In August 1914, the British Royal Navy came into the possession of code books for German naval communications, *Signalbuch der Kaiserlichen Marine*, and were able to determine the exact location of enemy ships.

Some media theorists have suggested that war and the media developed especially close ties during modernity. In his book *War and Cinema* (1989), French cultural theorist Paul Virilio argued that technologies of cinema and warfare possessed a fatal interdependence,

Max Radler, *Der Radiohörer*, 1930. The painting is a fine example of the German art movement *Neue Sachlichkeit*, a new objectivity in which reality was depicted with matter-of-factness. Städtische Galerie im Lenbachhaus und Kunstbau München.



from the disappearance of direct vision in battle to the remote killing of trench warfare and new military ways of optical seeing. And in Friedrich Kittler's view, it was no coincidence that film developed at the same time as automatic weapons; the mechanism in the first fully automatic Maxim machine gun was not unlike the one in a film projector. According to Kittler it is even possible to situate the development of different "media systems," *Mediensysteme*, in three war-like phases: "Phase I, beginning with the American Civil War, developed storage technologies for acoustics, optics, and script: film, gramophone, and the man-machine system, typewriter. Phase 2, beginning with the First World War, developed for each storage content appropriate electric transmission technologies: radio, television, and their more secret counterparts. Phase 3, since the Second World War, has transferred the schematic of a typewriter to a technology of predictability per se; Turing's mathematical definition of computability in 1936 gave future computers their name."

In his book *Gramophone, Film, Typewriter* (1986), Kittler asserted in a phrase of some notoriety that "the entertainment industry is, in any conceivable sense of the word, an abuse of army equipment." The



The painter and poster art designer Leonetto Cappiello – sometimes described as the father of modern advertising – produced hundreds of poster ads. The Spanish version of *El gramophone*, 1905, “la mejor máquina parlante,” the best talking machine, is one of his most enigmatic. What is the medium actually doing in court? Bibliothèque nationale de France, Paris.

last phrase, “Mißbrauch von Heeresgerät,” is an expression attributed to a German commanding officer who banned any broadcasting of news or music in 1917. Kittler argued that there were similarities between the way radar technology and television developed during the Second World War, with television becoming almost a kind of military by-product – not to mention how mechanized and increasingly automated codebreaking laid the foundations for the modern computer. During the war, mathematician Alan Turing was as much a computer pioneer as he was a cryptanalyst in his (and others’) secret work to crack the German Enigma machine’s codes at Bletchley Park, northwest of London. A recurring feature of Kittler’s take on media history therefore is that war drives media development more rapidly than anything else.

While warfare might have driven media evolution, new media did not always replace the old. Even if radio communications were important in the Second World War, it did not stop the Soviet Red Army from using an intricate system of carrier pigeons when defending Moscow in the winter of 1941. The use of carrier pigeons in warfare has a long

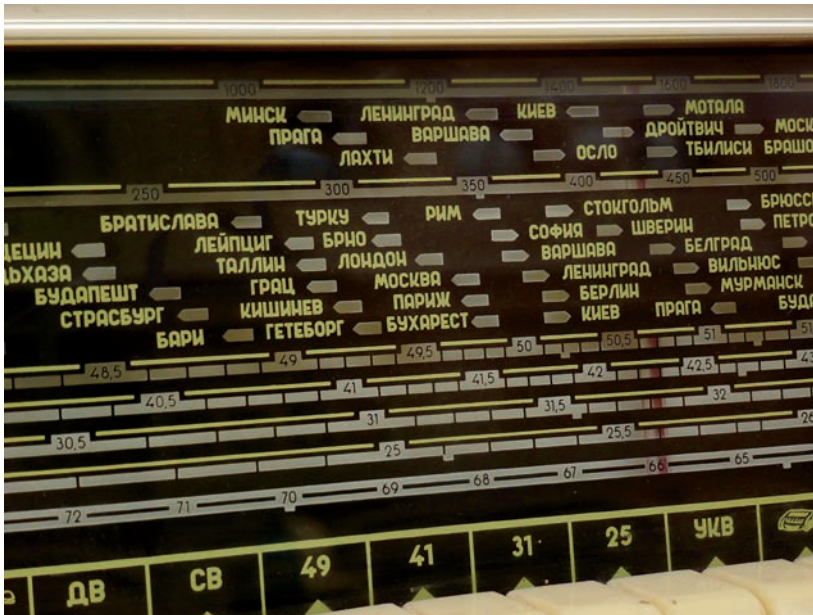
history; Julius Caesar used birds as messengers in his military campaigns. Due to their homing ability, speed, and altitude, carrier pigeons acted as military messengers during both world wars. Enemy soldiers often tried to shoot them down since they knew that released birds were carrying important messages. Some war pigeons became famous. The male pigeon William of Orange, working for the British military intelligence service, was awarded a medal for delivering a message from the Arnhem Airborne Operation in 1944. War pigeons are thus a good example of a residual communication form that was not immediately replaced by a supposedly technologically superior medium, such as radio. Pigeon communication also had other links to media; motivated by the prospect of military applications, a German apothecary in 1907 invented pigeon photography as an aerial photographic technique. An intricate pneumatic system in a small camera, attached to the body of the bird, controlled the time delay before a photograph was taken.

Radio was a vital medium during the Second World War. At the start of the war, superior military communications – all German tanks were fitted with radio – gave an advantage and a capacity for more complex battle tactics. The history of radio is thus as much military as it is civil, a fact shared by a number of other contemporary media. Like telegraphy, radio was perceived as a borderless medium without geographical restrictions. Radio waves acknowledged no physical centres or margins; unlike today’s traceable IP addresses, a numerical label (usually) linked to a nation, radio could avoid political control in theory. Radio was important in both totalitarian Nazi Germany and Soviet Russia. In 1933, on direct orders from Joseph Goebbels, the *Volksempfänger* (people’s receiver) began to be produced, and as cheaply as possible so that every German could afford a receiver. The propaganda potential of radio was obvious, and only German (and later Austrian) stations were marked on the tuning scale of the *Volksempfänger*. Listening to

OVERLEAF | Pigeons as media. Pigeon aerial photography was developed by the German Julius Neubronner in 1907, based on the bird’s capability to find its way home over extremely long distances. The same ability was used by the Red Army during the Second World War. The pictured document shows the Soviet “schedule of carrier pigeon communications in the system defence of the city of Moscow” in the winter of 1941. The symbols in the schedule indicate the central pigeon station (pyramid), nursery (rectangle) – where the pigeons raised their young – pigeon stations in the city (circle), communication line between the pigeon stations (pigeon with red line), and communication line to the central pigeon station (pigeon with blue line). Wikimedia Commons.







Listening to international and Western-oriented radio was banned in the Eastern Communist bloc. At the same time, the display on Soviet radios (in the Cyrillic alphabet) listed cities such as ПАРИС (Paris), БРУССЕЛС (Brussels), and ЛОНДОН (London). The scope of the radio medium was limitless, even if some content needed to be censored. Private photograph.

foreign news was possible – yet once the war broke out tuning into a *Feindsendern* (enemy broadcast), such as the BBC was a crime. “Rundfunkverbrecher sind Volksverräter” (broadcasting criminals are traitors), as Nazi propaganda would have it. Such draconian measures were not taken in Soviet Russia but listening to international and Western-oriented radio was banned in the Eastern Communist bloc. At the same time – acknowledging the media specificity of radio – the display and tuning scale on radios manufactured in the Soviet Union listed places such as ПАРИС (Paris), БРУССЕЛС (Brussels), and ЛОНДОН (London).

Leading up to the Second World War, the 1920s and '30s saw the advent of amateur radio. Since radio was a reasonably simple technology to use – one could even broadcast oneself – the medium prompted a lively amateur radio culture of listeners and broadcasters during the interwar years. So-called crystal radio receivers became popular in the 1920s. Later, German writer Bertold Brecht argued that radio should be converted from a means of distribution to a proper communication medium (for two-way communication). While public service radio was

established in western Europe, American commercial radio tried to capture a mass audience by making a profit from advertising revenue. During the 1930s, commercial broadcast radio became part of daily life in the United States, with soap opera serials, music, and crime dramas. A good deal of US programming heard by listeners was controlled by advertising agencies, and many radio shows had links to the film industry. Radio programs such as *The Lux Radio Theatre* were based on stories taken from Hollywood and featured movie stars reading live radio versions of their motion-picture roles. Future filmmaker Orson Welles's radio adaptation of H.G. Wells's science fiction novel *The War of the Worlds* – performed live over the Columbia Broadcasting System radio network in 1938 – is likely the most famous program of the time, creating panic among listeners who believed that Martians were invading Earth. The program is still thrilling and can be found on Wikimedia Commons.

In Europe, inspired by American commercial radio and the medium's borderless nature, Radio Luxembourg – founded in 1931 with a permit from the tiny duchy of Luxembourg – began to broadcast programs funded by advertising. After 1934, by way of a powerful transmitter, the station became increasingly popular with entertainment in different languages. As no other European country offered advertising-supported entertainment, Radio Luxembourg soon attracted a massive number of (mainly young) listeners across Europe with its programs of otherwise unobtainable popular music. Almost everywhere else, national governments had a monopoly on broadcasting. Yet, Radio Luxembourg took advantage of the impossibility to control what was sent out into the ether, particularly on shortwave and medium wave.

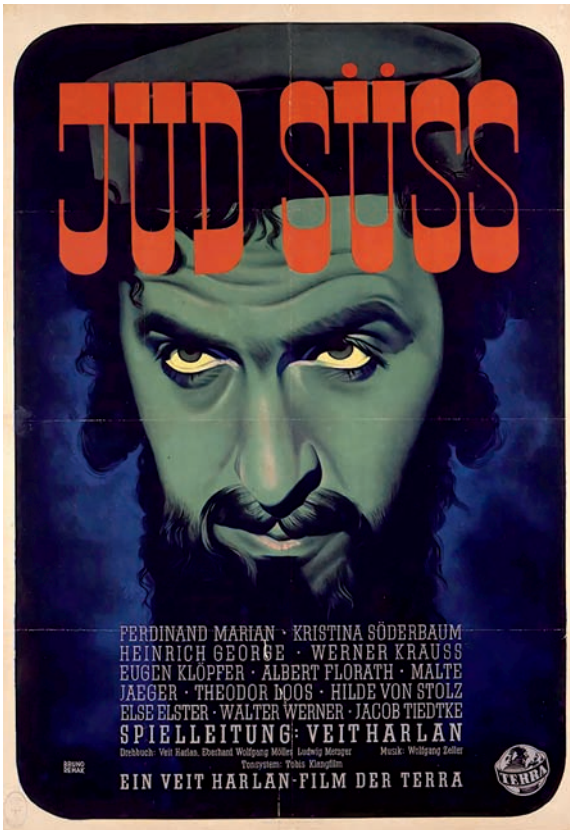
In his book *Postwar*, historian Tony Judt explains that radio retained its position as the chief source of information and entertainment for Europeans well into the 1950s. Almost every European family owned a radio. “It was from the radio that people got the news, and if there was a common national culture it was shaped far more by what people heard than from what they saw or read. In every European country at this time radio was regulated by the state ... Broadcasting stations, transmitters and wavelengths were licensed and typically owned by national governments: symptomatically, the few radio stations transmitting from outside national frontiers were usually situated on ships or islands and colloquially referred to as ‘pirates.’”

The centrality of radio was also evident in the Communist Eastern Bloc, where radio was used as a channel for state propaganda. Despite

the fact that radio displays and tuning scales featured the names of major cities in the West, after the war the Soviet Union began to use radio jamming technology to prevent people from listening to the BBC or the Voice of America. A couple of hundred such signal jammers are thought to have been in operation in the early 1950s.

Since mass media by definition appealed to a broad audience, it was inevitable, as we have seen, that broadcast media such as radio or film would be used as channels for ideological propaganda. “Of all the art forms, film is by far the most important for us,” Lenin declared in 1922. The agrarian population in the Soviet Union was largely illiterate, and building on the propaganda tradition of *agitprop*, films alongside radio were effective ways to mould people into good Communist Soviet citizens. Sergei Eisenstein’s famous montage films such as *Battleship Potemkin* (1925) and *October* (1928) belong to the canon of film history – though they performed quite poorly at Moscow’s cinemas; even the Russians preferred entertaining American films. Film was also an important medium for Nazi Germany, where Goebbels built an impressive media propaganda apparatus. The Nazification of Germany happened quickly, and after the forced standardization known as the *Gleichschaltung*, the totalitarian state seized control of all media and information channels. From 1933, the Reichsfilmkammer ruled over the entire German film industry, for example. Alongside explicit propaganda films, the Reichsfilmkammer produced escapist melodramas usually based on Nazi ideology, sometimes anachronistically set in the eighteenth century as in the anti-Semitic film *Jud Süß* (1940), a popular success seen by some twenty million Germans. Money was also poured into the film company Universum Film AG (Ufa), and the production of the newsreel *Die Deutsche Wochenschau* (The German Weekly Review), especially after the war broke out. It arguably became the leading non-fiction film output of any country involved in the war. The cameramen of the German propaganda companies, *Propagandakompanien*, delivered superb footage, and in contrast to the newsreels of the Allies, which were dependent on a constant expositional voiceover, the German newsreels relied on striking images, intricate editing techniques, and dynamic visual montages. Around 500 people were involved in the production in Berlin, and each weekly newsreel opened with a title card stating which of the propaganda companies’ film cameramen had provided material – sometimes with a cross after the name if the person had been killed in action. Ufa also produced newsreels for the film markets in the countries under Nazi occupation, the so-called *Auslandstonwoche*, with voiceovers in native languages.





*Jud Süß* was a 1940 Nazi German historical drama and anti-Semitic propaganda film directed by Veit Harlan, starring his wife Kristina Söderbaum. Propaganda minister Joseph Goebbels took an active role in the production of the film, and after the war, some of the leading cast members were brought to trial as part of the denazification process. Internet Movie Database.

These newsreels were also screened in neutral countries like Sweden, and up until spring 1945 it was possible to see German newsreels presenting the war from a Nazi perspective in Swedish cinemas: “The Ufa newsreel, astonishingly intense images of world events. Showing the audience the places where global history is being made” – so read advertisements in Stockholm newspapers. Since footage from these newsreels is nowadays a permanent fixture of almost every television production about the Second World War, our picture of Nazi Germany is still being dictated by Goebbels’s Reich Ministry of Public Enlightenment and Propaganda.

Leni Riefenstahl’s documentary *Triumph des Willens* (1935) is otherwise the best-known film from Nazi Germany. It was aesthetically innovative with its use of massed troops and audiences, and German schoolchildren had to write essays on what it was like to see the film at the cinema. Riefenstahl also made a much-discussed film about the Berlin Olympics in 1936, *Olympia*. From a media history perspective, perhaps the most interesting thing about these games was that they



were televised. The 1930s saw experiments with a range of television technologies, following the pioneering efforts of Scottish engineer John Logie Baird with his rudimentary televisor in 1925. Television technology improved, and by the time of the Berlin Olympics it was even possible to deploy a colossal Telefunken Ikonoskop-Kamera – a *Fernsehkanone* – inside the Olympic stadium. As many as 150,000 Berliners watched the games at around thirty special television viewing locations (*Fernsehstuben*) around the city.

Although audiovisual media were used as propaganda tools by totalitarian states such as Nazi Germany and the Soviet Union, the media offerings in these countries were quite wide. Hollywood films were more popular in Moscow than aesthetic film experiments. Media were also perceived differently by political leaders; avant-garde art was different from avant-garde film, at least in Nazi Germany. While the *Entartete Kunst* exhibition was touring Germany from 1937 to 1941 showing so-called degenerate, modernist art, the film magazine *Der Deutsche Film* was enthusiastically praising avant-garde filmmakers. At the same time as the Nazis were purging modern art from museums, they were encouraging a modernist aesthetic in film. One explanation for this artistic anomaly is that the Third Reich's contradictory ideology featured a reactionary modernism. The role of mass media culture in Nazi Germany is therefore debated. Anyone who preferred not to cheer Hitler at the Nuremberg Rally in 1935 could instead watch a scantily clad troupe of Dutch tap dancers performing at the Apollo Theatre at the very same time. The fact that Hollywood films were being screened at German cinemas up until 1940 also suggests an ideologically ambiguous media landscape.

Then again, media in Nazi Germany were also ruthlessly politicized, with motion pictures used as a medium for harsh anti-Semitic propaganda. The most notorious production was the film *Der ewige Jude* (The Eternal Jew) from 1940, a pseudo-documentary against “international Judaism,” which included authentic scenes of starving Jews shot in the Warsaw and Lodz ghettos by German propaganda companies. One of the film's most infamous sequences compared Jews to rats that carry contagion. Anti-Semitic caricatures had been prevalent in European publications for a long time – with the French Dreyfus Affair around 1900 as a focal point; Alfred Dreyfus was a Jewish army officer falsely accused of treason.

Media history is thus full of discrimination – from nineteenth-century printed caricatures of racial segregation in the southern United States to D.W. Griffith's racist feature film *The Birth of a Nation*

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**LES « LYNCHAGES » AUX ÉTATS-UNIS**  
Massacre de nègres à Atlanta (Georgie)

Racial violence in the US, as reported and illustrated by *Le Petit Journal* in 1906. Bibliothèque nationale de France, Paris.

(1915). In the US anti-black imagery was overwhelmingly present in a number of media. These ranged from brute depictions of black men as savage, animalistic, and criminal to the lazy coon, pickaninnies, or Sambo caricatures. According to the African-American historian Rayford Logan and his 1954 book *The Negro in American Life and Thought: The Nadir, 1877–1901*, the late nineteenth century was a period when American race relations were the most intense and anxious, with frequently mediated anti-black propaganda, violence, and lynching. Following Logan, racist caricatures were also prevalent in more liberal newspapers and magazines. African-Americans who fled the southern horrors – with its many newspapers that repeatedly championed white supremacy – found the white northern press only marginally

less hostile. Sadly, anti-black caricatures continued to be a recurrent motif in American mass media during the twentieth century: ordinary products with images that portrayed blacks in negative ways, racist cartoons (by Disney and others), games and toys spreading racial stereotypes and prejudice, and countless figures of the Mammy, the enduring racial caricature of African-American women.

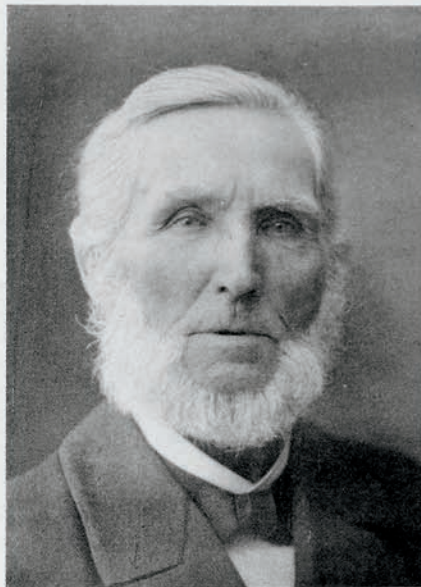
Aside from the representations of stereotypes in different commercial media there also exists an often-distressing history of colonial media being used as an instrument to document and evaluate other, non-Western cultures and societies. Within visual anthropology, for example, during the nineteenth century photography was widely used as a tool of research. The Austrian doctor and anthropologist Rudolf Pöch not only brought an ordinary camera when undertaking an expedition to New Guinea in 1901; he also took with him a phonograph, a stereoscopic camera, and a Bioscope film camera, to register and record the indigenous population. Pöch tried (in vain) to find scientific evidence for the existence of pygmies, and his systematic anthropological documentations were largely carried out within the administrative confines of a German colonial apparatus. The media-supported work of Pöch and other anthropologists eventually became used in domestic studies too. The Swedish State Institute for Racial Biology, for example, was inaugurated in 1922, in order to register and classify the Swedish people with the help of photography (and various measuring tools). Some 12,000 photographs were taken to document and portray the different races living in Sweden, with the purpose of enabling eugenic strategies that would strengthen the so-called Swedish race.

OVERLEAF | Among the so-called pure Nordic types in Herman Lundborg's *Svenska folktyper* from 1919 – a “eugenic coffee-table book,” published to summon further support and funding for the cause of eugenics and scientific racism. The book described racial characters in Sweden: a “Businessman. Nordic type,” an “80-year-old schoolteacher from Fårö, Gotland. Nordic type,” as well as two Swedish women of “Nordic type.” In the more sinister section on “vagabonds, gipsies, criminals, and the like,” a man and a woman are labelled as “racially mixed.” Other people were described in a similarly pejorative way as “socially inferior.” The images in Lundborg's publication were initially displayed at a travelling exhibition on Swedish racial characters – with funding from national museums, cultural celebrities, and notable researchers – as a way to promote eugenics, and the subsequent establishment of the Swedish State Institute for Racial Biology in 1922. Of the hundreds of persons whom Lundberg portrayed in his publication no one was named. Herman Lundborg, *Svenska folktyper* (Stockholm: Tullberg, 1919).



Affärsman. Nordisk typ.

*Enskild samling.*



80-årig skollärare från Färö invid Gottland.  
Nordisk typ.

*Foto. H. Ljungqvist, Visby.*



Svenska av nordisk typ.

*Enskild samling.*



Svenska av nordisk typ.

*Foto. H. Ljungqvist, Visby.*





Rasblandad man.

*Foto. N. Moosberg, Uppsala.*

Densamme.

*Foto. N. Moosberg, Uppsala.*

Rasblandad kvinna.

*Enskild samling.*

Densamma.

*Enskild samling.*



There exists a media history of eugenics, with linkages to the ways that media were politicized in Nazi Germany. Yet mass media also became political in the sense that conducting *all* forms of party-political activities meant thinking about how these could be given a mass media appeal. Still, it was not just totalitarian states that recognized the political and ideological potential of the mass media. Some argued that the whole cultural industry – led by Hollywood’s escapist films – dazzled people as much as it dumbed them down. If the twentieth century belonged to mass media, it also fostered a period of mass media research. Interestingly, it was Nazism that inspired the academic study of the popular culture of the time with a focus on its societal impacts. For the academics within the so-called Frankfurt School – many of whom were German Jews forced into exile in 1933 – mass media studies were a recurring theme within the critical theory they developed. Intellectuals had previously expressed concern about *dime novels* or the evils of cinema, yet, during the interwar years, at least according to critical theory, the daily press, photography, illustrated press, radio, and film formed a kind of multimedia system, a *Medienverbund*, in the shape of a dominant (and often manipulative) social logic that steered the population in particular directions, both commercially and ideologically.

The cultural diagnoses of the time were often quite dark – with some exceptions. For philosopher Walter Benjamin, the popular media (particularly film and photography) held democratic potential, and he nurtured a kind of romantic revolutionary faith in the ability of media technology to unveil aspects of reality that would otherwise remain hidden – an “optical unconscious” to use the vocabulary of Benjamin (and Sigmund Freud). In contrast, cultural critic Siegfried Kracauer believed that illustrated magazines concealed as much as they revealed, not least in terms of power structures in society. In a 1927 essay on photography, originally published in the newspaper *Frankfurter Zeitung*, Kracauer stated that the simple reproduction of reality says very little. “Never before has an age been so informed about itself, if being informed means having an image of objects that resembles them in a photographic sense ... Never before has a period known so little about itself. In the hands of the ruling society, the invention of illustrated magazines is one of the most powerful means of organizing a strike against understanding.” Later, Kracauer went even further, asserting that the silent Weimar-era films, with their brilliant criminals and mad despots, provided a sociological foreshadowing of Hitler. With reference to the silent horror film *The Cabinet of Dr.*



## Television, Technology, and Society | RAYMOND WILLIAMS

Was television a medium that changed the world, or was it a manifestation of technological opportunities and socio-cultural circumstances? Do media drive social development, or are they rather a symptom of social, economic, and political processes? What is the relationship between media and society?

Taking television as an example, British cultural theorist Raymond Williams attempted to answer these questions in his book *Television: Technology and Cultural Form*. When it was published in 1974, in-depth studies of TV were still uncommon, but Williams had already conducted several studies of everyday media practices. He had also paid a great deal of attention to TV, first as a critic for a BBC magazine and later as a visiting professor at Stanford University in California, which is why comparisons between British and American television were so central to his book. In contrast to the enlightening, didactic (and paternalistic) tradition of British public service broadcasting was America's commercial television with its never-ending ad breaks.

Yet despite these interruptions, Williams described American television as featuring a constant *flow* of images that erased the distinct boundaries between programs. Dazed one night in Miami, after spending a week on a transatlantic liner, Williams began watching a film on TV "and at first had some difficulty in adjusting to a much greater frequency of commercial 'breaks.' Yet this was a minor problem compared to what eventually happened. Two other films, which were due to be shown on the same channel on other nights, began to be inserted as trailers." In his mind all these pieces

and genres flowed together with the ads in "a single irresponsible flow of images and feelings." The *flow* was ultimately about keeping the audience's attention (and serving advertisers), in contrast to the European tradition of specific programs making up the medium, with a clock slowly counting down to the next program.

While Williams's book may be best known for its discussion of television's flow, its most important theoretical discussion was about media's relationship to social development. The purpose of his study was to analyze television as a "particular cultural technology." Unsurprisingly, Williams strongly opposed the tradition of optimistic technological determinism – that is, that technology is a powerful driver of social change – which he felt characterized Marshall McLuhan's media theory. As a counterpoint to McLuhan's generalizations about the effects of media technology on society, which often overstated the revolutionary capability of each new medium, Williams offered a more nuanced perspective. To understand how a medium such as television influenced society, it was necessary to pose precise questions about how a media technology was used, about the institutions that regulated the medium (and how they changed), and about the content and form of the medium. British and American television were, for example, completely different media forms. According to Williams's socio-cultural media theory, only when you had examined television within its specific economic, social, and cultural contexts did it become possible to say anything about the social significance of the medium.

*Caligari* (1920), Kracauer wrote a book about German cinema while in American exile, which he elegantly titled *From Caligari to Hitler: A Psychological History of the German Film* (1947).

After fleeing Germany, the leading thinkers of the Frankfurt School, philosophers Theodor Adorno and Max Horkheimer, eventually ended up in California. While in Hollywood they discerned similarities between the media landscapes of Nazi totalitarianism and American capitalism, with all content cast from the same mould; propaganda and consumerism were two sides of the same media coin. In their culturally pessimistic book *Dialectic of Enlightenment* – published in 1947, yet initially receiving scant attention – they introduced the term *culture industry*, which later became a core concept and framework within media and cultural studies. As Marxists of sorts, Adorno and Horkheimer equated the soulless mechanization of work, embodied by the conveyor belt, with a similarly superficial and exploitative range of leisure-time entertainment: people were abused at work as wage slaves, before being indoctrinated in the darkness of the cinema. Before this, Adorno had become involved in an American radio project led by sociologist Paul Lazarsfeld. There were thus early ties between a US sociological tradition of empirical media studies, as expressed for example in Lazarsfeld's book *Radio and the Printed Page: An Introduction to the Study of Radio and Its Role in the Communication of Ideas* (1940), and a more European approach, uniting quantitative perspectives on media use with qualitative diagnosis of media criticism. During the postwar years, this paved the way for the British media research tradition that developed from the works of, among others, Raymond Williams and from Birmingham's Centre for Contemporary Cultural Studies, founded in 1964 with researchers such as Richard Hoggart and Stuart Hall.

## ■ ■ ■ Mass Media Hardware: The Example of Japan

From the 1950s onwards debates raged in the public sphere about the mass media of the time, their effects on the general public, their freedoms and economic models, and relationships between media. With the advent of television in the US and western Europe during the 1950s – by 1956 approximately 70 per cent of American households already had a television set – a host of media technologies competed for people's time and attention. The impact of television was discussed with considerable regularity, and mostly in negative terms. Whether

diagnosing the reason for falling cinema attendance, a crisis in club membership, or fewer books being read, everything was the fault of TV. The companies that sold television sets were naturally more than happy. Media history usually focuses on content – the Hollywood films, radio shows, or television programs of a period – but hardware and physical media devices also have an important history. The Dutch company Philips can serve as a case study; in 1933 it became the world's largest radio manufacturer. The company also sold light bulbs, vacuum tubes, and electric razors. In 1949, Philips started producing TV sets, and a year later launched the record label Philips Records. If the digital age is sometimes described as a period of media convergence, the same was true of media hardware in the 1950s. Philips is a good example of a radio manufacturer that gradually turned into one of the world's largest electronics manufacturers. It was Philips that introduced the portable cassette player in 1963, and the market rapidly diversified. Production of radio and TV sets was accompanied by various new forms of home electronics, with Philips soon manufacturing a whole spectrum of media devices. The nature of music-playing devices also came to govern how content was consumed; during the heyday of the cassette tape in the 1970s and '80s all pop music was released on both vinyl and cassette.

During the summer of 1963, Philips introduced its first compact cassette recorder at the Funkausstellung (Radio Exhibition) in Berlin. Royal Philips.





Nintendo's small handheld game consoles Game & Watch went on sale in 1980 and became very popular worldwide (appreciated by both children and adults). In the game *Parachute*, paratroopers streamed out of a helicopter faster and faster and – if they were not caught with a rowboat (which could only be moved to the right or left) – were chased by sharks. If you were eaten three times, the game was over. Game & Watch was played in “wide screen” – a relative term in media history. Private photograph.

Although the emergence of the mass media society during the postwar years was primarily a Western phenomenon, the devices that made this transition possible were increasingly coming from the Far East. Philips's main competitor was found not in the US – but in Japan. In many ways, the geographical focus of (hardware) media history hence shifted east, as Japanese electronics came to dominate the market for media devices. Following the Second World War, a number of media companies were (re)established in Japan with a focus on consumer-oriented microelectronics, sometimes called home electronics. Most of these companies had been founded before the war, but by exporting ever more advanced media-related industrial products, Japanese companies came to dominate the world market. There are plenty of examples: Sharp (founded in 1912) with its focus on radio and TV sets; Hitachi (founded in 1910), which produced large computers and electronic components; the Fuji Group (founded in 1923), specializing in electronic equipment and television sets; camera maker Nikon (founded in 1917); Casio (founded in 1946), with its many calculators and watches; and JVC (Japan Victor Company), a maker of audio, video, and consumer electronics (founded in 1927), bought by



Matsushita in the 1950s and later better known as Panasonic – not to mention the gaming company Nintendo (founded in 1889), which initially manufactured playing cards before later focusing on TV and computer games.

When it came to Japanese media companies, however, the real leader of the pack was Sony, founded in 1946 and still one of the world's largest multinational technology conglomerates. By obtaining a permit to use American transistor technology, Sony was able to become an early producer of transistor radios, which proved extremely popular. The transistor was a small semiconductor device that served as a current amplifier, and from the 1950s onwards it was the central building block for practically all modern electronics. Sony launched its first transistor radio in 1955 and the first transistor TV a few years later. The recipe for success was based on technical innovation, high product quality, and advanced design. Sony quickly became the market leader, even though some experiments failed, such as the Betamax video format (launched in 1975). The format was outcompeted by VHS (Video Home System, produced by JVC) during the so-called *videotape format war* that raged in the mid-1980s. It is often said that Betamax was technically a better format (in terms of picture quality), but that JVC was more accomplished in marketing its VHS format. The same fate befell the Video 2000 format (developed by Phillips and Grundig in Germany), which had the best video and audio of all the consumer formats but wasn't launched until 1979. At that time VHS had begun its market dominance, a position that it retained until the introduction of the DVD format in the late 1990s.

While other companies were producing ever larger devices, Sony made them smaller, focusing on mobility and precision technology. Towards the end of the 1970s, this led to the launch of the Sony Walkman, a small portable cassette player (with a radio) that came to revolutionize music listening and became synonymous with a whole new type of mass media consumption. The Sony Walkman became a huge sales hit, with almost 190 million devices selling around the globe, in many different versions, over the coming years. The story of the Sony Walkman is also interesting since for marketing reasons the device had different names in different countries. It went by the name Walkman in Japan, but in the US it was initially called the Soundabout. In the UK it was named the Stowaway, and in other countries it became the Disco Jogger – in Sweden it was inexplicably called the Freestyle. The Swedish Language Council declared the correct name to be *bärspelare* (carry-player), but the English word “freestyle” had already taken

hold among the populace and so it remained. As such, a freestyle later came to be used as the generic term for what the Swedish Academy's dictionary still calls a "portable music player with headphones."

The fact that the Sony Walkman became a byword for mobile media use indicates the popularity this little device generated. Throughout the 1980s, in English-speaking countries a Walkman meant any portable cassette player, in the same way that other successful media products have become generic for different types of media use. Making photocopies in the US, for example, is called xeroxing (after the Xerox Corporation, which began selling copiers in the 1960s), and the dictaphone – an office machine for recording and playing back dictated messages – was initially the name of a specific machine from one of telephone pioneer Bell's many companies. Within media history, it is not uncommon to see this kind of genericized trademark, and it just goes to show how certain media became normative, for better and worse. In the early 2000s, for example, the BlackBerry phone became more or less synonymous with mobile email, yet less than ten years later it had lost the market to Apple and Samsung. Nokia suffered a

Sony's Walkman was launched in 1979 – a portable media device with which you could listen to your own cassette tapes anywhere. The Walkman's popularity lay in the individualized and mobile media use, but the lightweight headphones also proved to be a significant success factor. Private photograph.



similar fate in India: because Nokia mobiles completely dominated the market there, Nokia was the actual word used for mobile phone, but after 2010 the Finnish mobile phone giant saw its market share plummet. Of course, Apple is the prime contemporary example of a company that has launched trendsetters and generic terms for a particular media form. By the turn of the millennium, the iPod had come to mean practically any mobile and personalized listening device and also spilled over into a certain type of radio program, *podcasting*.

Having developed into a multinational electronics corporation – not least by working with Philips to launch the CD format in 1982 – Sony is also a good example of the ways that mass media hardware manufacturers and content producers began to converge in the 1980s. At the time, so-called horizontal integration became a successful concept for technology and media companies, and a way to build companies that included similar functions but from different value chains. In the 1980s, Sony began to buy its way into both the music and film industries by acquiring the US company CBS Records (1987) and the film studio Columbia Pictures (1989). In 1994, Sony diversified further by entering the computer games market with the PlayStation console, which quickly took major parts of the market from already established names such as Nintendo.

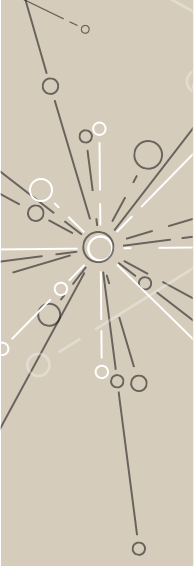
The development of video and computer games can, to a large extent, be attributed to the dominance of the Japanese electronics market. Computer games are interesting as a kind of combination between public and private entertainment. The gaming and entertainment company Nintendo, for instance, produced software-based products for public video arcades as well as for home use. It also introduced a tradition of recurring titles, figures, and characters – from Mario to Donkey Kong – to create a distinctly recognizable gaming universe. The single Japanese computer game often picked out as a trailblazer is *Space Invaders*, which became a huge technical and public success. Launched as an arcade game in 1978, this two-dimensional, black-and-white game involved shooting descending space aliens using a laser cannon that moved sideways along the bottom of the screen. Gameplay mechanics that responded to the actions of the player, with the aliens adapting to the way the player controlled the cannon, made the game a formidable success in Japanese video arcades. In its first year alone, over 100,000 *Space Invaders* arcade machines were installed across Japan.

Along with the tennis game *Pong*, launched a few years earlier by the video game company Atari, *Space Invaders* laid the groundwork for



Japanese advertisement for the arcade game *Space Invaders* from 1978 – developed by game designer Tomohiro Nishikado at the Taito Corporation, with inspiration from the movie *Star Wars* (1977) as well as H.G. Wells’s *The War of the Worlds* (1898). [Nintendo.fandom.com](https://nintendo.fandom.com).

the subsequent breakthrough of the video and computer games industry. In short, the Japanese gaming industry turned computer games into another mass medium. Economic history research has suggested that there are many reasons for the runaway success of Japanese electronics companies after the Second World War: the introduction of new technology and a new leadership style (rebuilding infrastructure destroyed by the war), entrepreneurship and innovation-driven industry with strong political backing, and a focus on international markets. These are traits that also characterize the similarly successful Japanese car industry. In hindsight, it is clear that Japanese companies produced high-quality precision technology, primarily of an electrical and mechanical nature, such as the Sony Walkman. However, that device (like many others) contained no computational software of any kind. When, around the turn of the millennium, media culture became increasingly digital, with a rapid transition to fully electronic (and digital) media devices, this presented the Japanese electronics industry with major problems in maintaining its popularity and market dominance.



Cyborgs are more common than you might think. Large numbers of people have various kinds of technology incorporated into their bodies, from pacemakers and hearing aids to implanted RFID computer chips or contraceptives such as the coil. Then again, science fiction is the main source of stories about changed (and enhanced) bodies. These tales have often focused on computer technology transforming bodies, as in the films *Blade Runner* and *Terminator*.

But what place does the human body have in an age dominated by computers and information? Are humans still the benchmark for all things – as classical humanism claimed – or have we entered a posthuman condition, where the human is no longer a closed subject with a discrete body? Does DNA information have to be bound to a human organism? As advances are made in robotics and artificial intelligence, we may be approaching a time when it is possible to download human consciousness into a computer.

Such questions form the starting point for American literary scholar N. Katherine Hayles's *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics* (1999). She presents a history of how humans gradually became posthuman, and eventually also increasingly *embodied* through modern technology. Adopting a feminist perspective, Hayles focuses on virtual corporeality and, paradoxically, on how information “lost its body” since within classic information theory (Shannon) it no longer needed a subject but was separated into its own (disembodied) category. “When information loses its body, equating humans and computers is especially

easy, for the materiality in which the thinking mind is instantiated appears incidental to its essential nature.” Later, once the whole human genome had been mapped, the human came to *solely* comprise information.

Hayles is careful to stress that the development towards a posthuman state has not been linear, “rather, ‘human’ and ‘posthuman’ coexist in shifting configurations that vary with historically specific contexts.” As her point of departure, she takes 1950s cybernetics, which emphasized the similarities between biological, mechanical, and electronic systems – where regular responses and feedback were key – whether in living beings, machines, or organizations.

In tracing the emerging encounters between humans and intelligent machines, Hayles follows three lines of development: the disembodiment of information (through the internet or DNA); the gradual construction of the cyborg, where she draws attention to fictional characters and narratives; and the general move from human to posthuman, as the borderline between the internal and the external world becomes increasingly permeable. She sees this trend as both alarming and exciting; alarming because humanity risks being outcompeted as the planet's most intelligent being, but exciting because the posthuman state offers new opportunities to explore humanity, freed from the ties of subject and body. According to Hayles, being posthuman doesn't mean an end to the human race – only that a particular view of what a human is has ceased to be relevant. Seen through a feminist lens, the distinct differentiation between male and female then also loses all meaning.



## ■ ■ ■ Everyday Media

Media use as related to Japanese arcade games hints at a history beyond what is generally peddled about the twentieth century and its mass media institutions (press, radio, and television). Consequently, there are good reasons to draw attention to more everyday and work-related media history that exists alongside the traditional way that mass media have been used and perceived. Media have been incorporated into all sorts of administration practices to which media scholars often devote little attention. As we have previously remarked, it is often through the media themselves that we can now discern such historical forms of usage. Everyday media use in the twentieth century is probably the easiest to overlook as it became unremarkable very quickly. Still, the ordinariness of media use was apparent in offices, public institutions, and businesses. Bureaucracy in the private and public sectors, not to mention the modern office, are examples of places overflowing with commonplace media forms and devices: paper in different sizes, typewriters, folders, forms, microfilm, and stenography.

The history of stenography is a good example of an office technology that was expressly about speeding up the act of writing. In ancient Rome, the politician Cicero used speedwriting to note down his speeches, a system of shorthand invented by his secretary (and slave) Tiro. Later so-called Tironian notes became a more formalized system of shorthand used by the philosopher Seneca. During the medieval period the system was still in use and taught at European monasteries. Yet it was during the nineteenth century that stenography became a widely used technique for keeping minutes. Since regular letters take a long time to write, a writing system was invented (in the form of word pictures) for use in dictation in administrative and legal contexts, where the spoken word needed to be documented. Pitman shorthand was, for example, a phonetic system with symbols representing sounds rather than letters, presented by Sir Isaac Pitman in 1837. Stenography characters are simpler than letters; they make use of abbreviations and are generally formed so that the stenographer does not have to lift the pen from the paper. In the early twentieth century, it was common for women to be trained as stenographers for office work. Since the point of stenography was to be able to write at the speed of a person's speech, the technique was also important in the military for the prompt issuing of orders.

By looking at bureaucracy and office work in the early 1900s, it is possible to conjure up a bygone media landscape where stenographers,

carbon paper, typists, and thousands of forms kept the wheels turning. In 1922, the German Institute for Standardization launched the DIN 476 standard of A-series paper sizes, introducing the A4 paper format that would literally order office work for large parts of the twentieth century. Of course, there is also an equivalent history of the paper formats now dominating in North America, some countries in Middle and South America, and the Philippines – the ANSI Letter. Standardized paper formats were crucial to an efficient office, and modern forms needed to follow agreed formats, both to increase the speed of communication and to control it. Through these rationalizing measures, it also became possible to furnish the office with uniform desks and cupboards and equip them with printers and filing cabinets tailored to different paper and envelope sizes. Management historian JoAnne Yates's seminal book on the matter, *Control through Communication: The Rise of System in American Management* (1989), traces the emergence of the communication and information system characteristic of US companies during the nineteenth and early twentieth centuries. Then again, smaller countries like Sweden also tried to rationalize. As a modern and efficient welfare state, Sweden even issued a governmental committee to analyze how state bureaucracy and commercial companies could make their offices perform better and improve workplace communication. According to a 1948 "form committee," some 30,000 different forms were by then circulating within the Swedish state apparatus, while a national engineering company such as Asea had 7,000 for internal use alone. Such information flows needed to be managed in an orderly fashion – although some realized that increasing the capacity to handle information often meant that even more information was generated.

By far the most common media device in the office was the typewriter, which increased administrative speeds in the office, alongside the skills of the stenographer. The typewriter gained its characteristic and standardized look – with a keyboard, type bars, ribbon, and roller – in 1910, although many other models had come before. At one point, the typewriter was considered an aid and a kind of human prosthetic. In the 1870s, for example, the director of the Royal Institute for the Deaf in Copenhagen, Rasmus Malling-Hansen, designed a writing ball (operated with one hand) that made it into commercial production. German philosopher Friedrich Nietzsche was one customer, even if some sources suggest that he was not satisfied with his purchase and never really mastered the use of the instrument. Typewriting balls can be considered a detour from the main road of typewriter production.

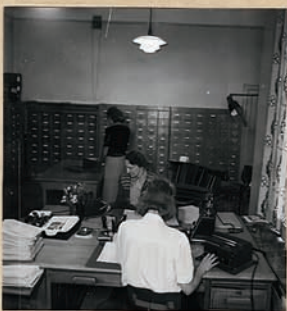


Italian artist Marcello Dudovich's 1926 advertisement for the M20 Olivetti typewriter. The motif is today abundant online, and can be purchased printed on stickers, postcards, mugs, or T-shirts. Wikimedia Commons.

OPPOSITE | On the Swedish photographer Gunnar Lundh's proof sheet from 1948, several everyday media from the mid-twentieth century are visible: typewriter, telephone, calculator, and forms. Nordic Museum, Stockholm.

Around 1900, US companies Remington and Underwood (with their European general agents) became the market's leading brands for the typewriter in its standardized form, joined later by Italy's Olivetti. The standardization was important; if at one office you could master one machine, you could also write on all the others. The identical positioning of the keys was particularly vital in this regard. The QWERTY format was invented towards the end of the nineteenth century and was named after the first few keys on the top row of the typewriter keyboard. The positioning of the letters was determined by the mechanics of the typewriter, due to the risk of the type bars clashing with each other and sticking. While the QWERTY layout on the typewriter was strictly mechanical, it established what some researchers have called path dependence, a kind of irresistible momentum where an initially mechanical problem (for typewriters) sets the tone and the standard for later technical developments. On a computer, the keys could be placed in any order – but the QWERTY format still prevails (just look at your own keyboard).

1948



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*533. q. a.*

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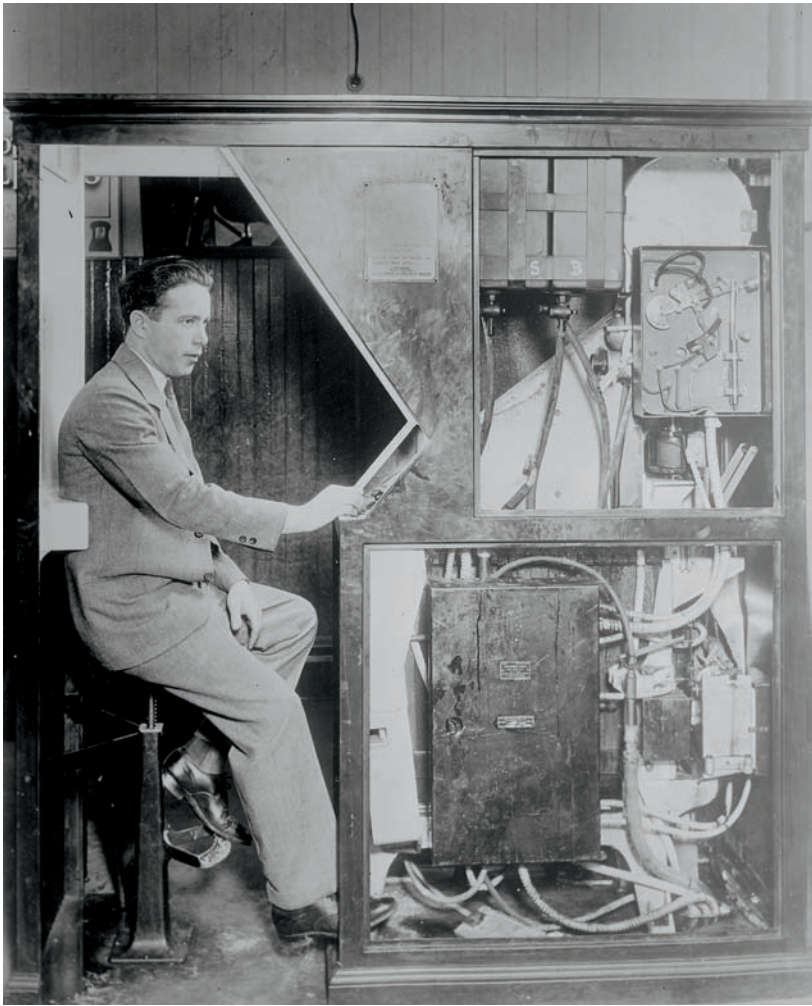


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Like the A4 and letter-size format, the typewriter brought greater rationalization for office work. Writing on a machine meant that all text looked the same, it was always legible, and with carbon paper multiple copies could be created at one time. The speed of writing also increased, of course, a skill that was rewarded in special typing competitions, where contestants had to type as quickly as possible with as few errors as possible. The typewriter was, moreover, a form of media that became explicitly gendered. Rows of women sitting at their typewriters soon became the epitome of the modern office and, like the product itself, *the typewriter girl* became a branded persona. Research has pointed out, on one hand, that the feminization of office work represented a hierarchization of working life, with women ending up in lower positions. The female secretary was often subordinate to a male dictator. On the other hand, the typewriter had a clear emancipating effect, helping women to make real inroads into the office sector. At the end of the nineteenth century, very few women worked in offices; half a century later they numbered in the millions.

While paper formats and typewriters were familiar to most office workers, the use of microfilm in the twentieth century provides another example of a media form that was used in several workplaces. Within archives and libraries, microfilm and photography were everyday means of documentation – media forms to document, identify, and store information for posterity. The status of microfilm shows how this medium reshaped the way society circulated and exchanged information beyond the flood of paperwork in the office sector. Photographic identification is another example of an everyday medium that arose around 1900 with significant social consequences. In the late nineteenth century photography had been used for documentation, both at museums and within legal systems. In the 1880s, the French police officer Alphonse Bertillon created an identification system based on physical measurements and photography. Later, similar photo-documentary techniques were developed, spreading to other domains. Having identity documents and passports with photographs, for example, allowed citizens' movements between countries to be monitored. Following a spying scandal in England during the First World War, the UK made photographs compulsory in all passports beginning in 1915. Like X-ray technology – which in the early 1900s was as much an entertainment medium as it was a medical instrument – the use of photographs as an evidentiary graphical index increased, as did demands for pictures in identity documents. A Swedish proclamation from 1917, for example, made it a statutory requirement for all





Inside the medium – Anatol Josepho, the inventor of the “Photomaton” photo booth, which was installed on Broadway in New York in 1925. Library of Congress, Washington, DC.

passports to contain a recent photograph. Photo studios may have been the usual place to get a portrait taken, but it would soon be possible to get pictures of yourself (alone or with others) in a photo booth; the first fully automated photo booth was launched in New York in 1925.

The history of identity documents suggests that everyday media use can reasonably be considered far-reaching. Another example is the consideration of money as a medium. We have previously discussed how coins and media were connected as metaphorical descriptions of modernity’s lowbrow cultural offerings, but payment systems also

OPPOSITE | Printed Yuan-dynasty banknote from 1287. The small Chinese characters in the bottom state: “Can be circulated in various provinces without expiration dates. Counterfeiters would be put to death.” The Master Charge credit card – later known as Mastercard – was launched in 1966 by a constellation of banks in California, a so-called interbank. The Latin word *medium* is usually translated as “in the middle” or “between,” and credit cards came to act as a financial intermediary between buyers and sellers. Wikimedia Commons.

had a practical history in the twentieth century. The paper banknote has long been a medium of exchange, a means of payment embodied in thin paper, and strictly based on an agreement that a literally valueless piece of paper will be ascribed a certain value. The first notes were used in China in the seventh century, and philosophers and thinkers have pondered their function ever since. Sociologist Georg Simmel wrote about the philosophy of money in his study *Philosophie des Geldes* (1900), for example. To Simmel, money was a means of communication for the exchange of goods and services (in line with classic economic theory), but money also served as a medium for achieving control.

It can be argued that money’s abstract function increasingly came to the fore in the twentieth century, not least through the everyday use of cheques and credit cards, both of which could be considered modern forms of media. It was in the late 1950s that banks began developing the idea of using credit cards (with delayed payment), eventually extending it to include international transactions. With a credit card, it was thus possible to buy now and pay later – as a medium, the credit card conveyed values between buyer and seller, and acted as an intermediary.

Money, paper size standards, and passports tend not to figure in traditional narratives of twentieth-century media history. But although these mundane and technocratic media forms have been given little attention, they can still serve as a kind of alternative, or indeed corrective, to the mass media understanding of the twentieth century. At the same time, it is worth remembering that everyday media use also changed the function of the traditional mass media. After a dazzling introduction most media usage became mundane; listening to the radio at home was ordinary. The mass suggestion that a propaganda minister such as Goebbels once wanted Nazi Germany’s controlled media to achieve stands in stark contrast to the individualized and often heterogeneous domestic media consumption of ordinary Germans at home in their living rooms.



Although media consumption was a mixed affair, from the 1950s onward television's main influence was to change how ordinary people in the Western world spent their leisure time. Television superseded radio and rearranged the living rooms of many. One of the very first Swedish television programs, *Philips presenterar: Vi ser på TV* (Philips presents: Let's watch TV), from spring 1954 made watching TV a theme in itself; the medium was the message. The program was shown not on public service television, but during a "TV-week" sponsored by film company Sandrews, which wanted to launch commercial television. Taking the form of an elegantly intermedial talk about telephones, radio, cinema, and television, the program showed exactly where in the living room the TV set should be placed (the presenter moved a small cardboard cut-out of a TV around a picture of a living room). Since Philips was a major radio manufacturer, care was also taken to point out that the two media were not competing with each other: "A good radio in one room will never go out of fashion just because you have a TV set in the other. They can never replace each other; you can't watch images on your radio, and you can't listen to radio programs on the TV."

A recurring aspect of everyday media use was the way daily tasks and routines pushed the media aside. Radio in particular established itself as a sort of media companion, at home and at work, with a range of programming that did not always have listeners' full attention. The device was present, but its programs were consigned to the background, since listening to the radio was often combined with other activities. Radio listening while driving a car was, at least in the US, a recurrent form of everyday media use. Already in 1946, nine million American cars had a radio, and once the semi-conducting transistor had been invented practically all cars came with a radio. In the early 1960s, one-third of all radio consumption in the US was lean-back listening in the car. It generated a specific radio DJ culture that played a constant mix of hit tunes – naturally, interspersed with commercials – so one did not have to make choices. Twentieth-century media history is thus also about the incidental dealings with the medium, which were commonplace. A Swedish Gallup poll from 1948, for example – based on similar international Gallup surveys – asked the following question about programs broadcast by Swedish Radio: "Here is a list of the morning programs available on a typical weekday. Could you please state which of these programs you listen to with only *half an ear* and which you listen carefully to?" If nothing else, listening to radio with half an ear has all the hallmarks of an everyday medium, and



Gallup's surveys provide an occasional glimpse of exactly that mundane media use.

Swedish ethnologist Orvar Löfgren has taken an interest in the almost invisible everyday media use that exists in various contexts, asking, for example: "Media rapidly becomes routine. How does that happen?" What did the sofa, the bed, or the kitchen counter have to do with media use in the second half of the twentieth century, not to mention bus journeys or babysitting? Löfgren has asserted that the media often invoked strong emotions – "from a wonderful sense of flow to impotent rage when the technology glitches" – and a valid question is whether media made daily life easier or harder. What the history of twentieth-century mass media reveals is that so-called new media were often forced to find their place among shifting activities of daily life, at least if they wanted to retain their popularity. Newspapers and books were naturally read at an individual level (and with a certain amount of concentration), but history often testifies to the way usage was commonly tied to other activities entirely. This is not to denigrate twentieth-century media practices. It is more of an observation about the ubiquity of the media in everyday life, as accentuated by the ever-present mobile phones that are currently our main media platform. "As people trained up their capacity for multi-tasking, in the 1960s they discovered that ironing and watching television worked well together," Löfgren has stated. At the same time, the notion of everyday media use has naturally changed over time (as has the time spent on ironing for that matter). Many parents in the 1970s were concerned that their children wanted to do their homework while listening to their cassettes of pop and rock music, but that kind of worry over everyday music consumption has changed. In the mid-2010s, Spotify began offering special student playlists; there are even playlists for "intense studying."

## Remediation and Mobility



Ever since George Gallup founded his public opinion polling company in 1935, media researchers have used surveys to study everyday media use through questionnaires and interviews with people trying to give rough answers about their media habits. This self-assessed media scrutiny was unproblematic as long as media use was foremost about the number of cinema visits a week or how much television people watched at home. It was possible to figure out the amount of personal



media consumption, including taking a narrow media definition for granted. In addition, such media research generally addressed how people *felt* about their media consumption.

But when media use became digital around the turn of the millennium, with people soon going everywhere with their iPhone or Samsung Galaxy that was always connected to the internet, it was no longer obvious how media use should be measured and quantified. While people would previously have hazarded a guess about their media habits and tried to truthfully answer how often they read film reviews, for example, such conjecture now became paradoxical as companies such as Netflix and Spotify were collecting more detailed personal data than ever. Suddenly internet suppliers, mobile operators, and platforms knew exactly how much media interaction had taken place.

Methods of evaluating everyday media use are drawn from the margins of the ongoing transformation of the media landscape from analog to digital. The advent of digital media around the turn of the millennium brought a fundamental change to society's media infrastructure, both in terms of greater mobility and through the way that computers became a multimediuum in which all other media coexisted and converged. Remediation is the term commonly used to describe this symbiosis.

On a general level, remediation and increased mobility can be seen as two distinctive features of digital media development from the 1990s onwards. Marshall McLuhan argued in the 1960s that all media were made up of other media: "no medium has its meaning or existence alone, but only in constant interplay with other media." The concept of remediation therefore tends to denote how an (older) medium is represented as a new medium or emphasizes how new (often digital) media have come to influence older (analog) media, as when traditional television resembles a computer interface with multiple boxes and rolling text messages carrying news, stock market updates, or sports information. The term remediation might seem tricky, but in essence describes how new media never come about entirely independently of older media forms.

As our book has repeatedly shown, this principle applies throughout history. Yet, during the last two decades, the term remediation has tended to signify the relationship between analog and digital media – often as a way of describing the latter. Media mobility is also a key characteristic of digital media. Today there is no real difference between what computers, mobile phones, and tablets are used for: they are all personal computers in one sense. But they have become increasingly

portable and mobile. One example is the way Apple has made its operating system (iOS), interface, apps, and software function and look the same, including working in a similar way on portable Mac computers, iPads, and iPhones. Another is how the cloud service Google Drive has organized users' content: "store, share, and collaborate on files and folders from any mobile device, tablet, or computer."

Computers, mobiles, and tablets are now digital devices with very similar uses, and both the hardware and the software are becoming increasingly similar. The history of the computer over the past forty years displays the same form of convergence as for content (remediation), including growing mobility – "the media-in-motion business," as media scholar Paul Levinson has dubbed the trend. When the personal computer was being developed in the early 1980s, the focus was on a computer used by a person in the home or the workplace, in contrast to mainframe computers in data centres. IBM was by far the world's largest computer manufacturer, and when their *personal computer* (PC) was launched in 1981, the intention was to sell it to small-scale companies. At that time, personal computers were fixed devices that would be known as *desktop* computers to differentiate them from later portable *laptops*.

It is no surprise that computers became increasingly mobile, because the same type of mobility and portability had previously characterized other key media devices, such as the transistor radio or the Sony Walkman. It is therefore also not surprising that, around the turn of the millennium, a leading computer manufacturer like Apple would begin producing a portable music player like the iPod, which was essentially a combination of a portable computer and a music player. From the iPod, the iPhone would soon be developed, more of a computer than a phone – even in its first model version. While the Sony Walkman brought together two media forms (cassette music and radio), the iPhone was able to incorporate a host of different media modalities (such as text, audio, still images, and video).

## Analog and Digital



Both the Sony Walkman and the iPhone became trendsetting media machines, and from a technological perspective the history of media between 1850 and 2000 could well be considered device-driven. This 150-year period saw the invention of myriad machines, large and small, to print and disseminate information, to photograph and record

sound, and to connect people. Most of the period's media devices were initially mechanical and chemical, before becoming electricity-driven. Finally, they became electronic through the first computers, which contained components (such as the vacuum tube) that could convert electrical signals (on and off) into ones and zeros. Some of the devices (such as Edison's phonograph) were used for both recording and playback, as well as storing information. With these time-based media technologies, it was possible to maintain a record of temporal events. Other devices were more spatial and bridged distances. Both radio and television were based on the principles of telephony and telegraphy for remote communication. By the mid-twentieth century, these devices had been refined – primarily as private consumer products for the home – and were then used mostly for domestic listening and viewing.

From today's digital perspective, all these devices – referred collectively as analog media – can appear antiquated. Most of us have no idea how a computer really works, while older media are often easier to decipher and comprehend. The term analog comes from the Greek *analogos*, which means proportionate or equivalent. A phonograph could record, store, and reproduce sound by engraving a track of varying depth into a rotating cylinder. The basic principle was not difficult to understand, and our point is that if you consider media in terms of devices, it makes it easier to differentiate analog and digital media, including how the latter developed out of the former. One approach is to focus on how analog recordings affected the actual media storing the information. The sound on a phonograph cylinder was proportionate to changes in the music; for example, a deep and wide track meant that a strong and loud sound had been recorded. The same was true for film; small photographic images (with changing light patterns) that differed slightly were recorded in sequence on a celluloid strip, and when passed through a projector at speed they created the illusion of movement, since our eyes (and brain) are not fast enough to distinguish individual images.

The analog media of the first half of the twentieth century are often described as being electric or chemical-mechanical, in contrast to today's digital media, which are electronic and numeric (based on numbers and mathematics). It is also claimed that media in digital form are intangible; they can no longer be touched, and have lost their status as physical objects, at least in comparison with (some) analog media. Analog media today refers to twentieth-century mass media such as television, radio, and newspapers. This is a rather imprecise

and sometimes misleading description, but in common parlance the term analog has nevertheless come to represent the opposite of digital. Despite this dichotomy, these media forms continue to coexist. Obviously, newspapers today are available in both the analog form of printed copies and in digital format (online or as a PDF). The media situation today is therefore similar to the one we have repeatedly described in this book. New (digital) media exist side by side with older (analog) media. We would in fact argue that this is the default for media history, its normal state. All media cultures throughout history (including our own) *simultaneously* comprise dominant, emergent, and residual elements.

However, media do differ from each other, and in a short time digital media have come to seriously challenge the forms and uses of traditional mass media. When it comes to production and distribution, as well as increasingly individualized media consumption, there are several reasons to claim that digital media are different. However, the issue is complicated since traditional mass media are now naturally also digital – with a novel character, format, and appeal. In digital form, the properties of previously analog media have ceased to apply; the *media specificity* of analog television no longer rings true in a context of streaming media.

One consequence of the digital production of newspapers, photographs, music, and television and their distribution over the web, is that the differences between media forms are disappearing; the common term for this phenomenon is media convergence. In digital form media are merging since computers have developed into the main multimedium of our time. Likewise, certain new media formats such as social and streaming media now incorporate a range of previously separate media forms. This is a significant shift in the media landscape, which has occurred within a very short time frame. As a consequence, it has been suggested that the concept of media itself is losing its meaning in the era of digital reproduction. In the same way that the end of the Cold War declared liberal capitalism the victor and made only one ideological stance viable, a digital convergence culture (in computers and on the internet) might mean the end of media history, because only one single digital multimedium will remain – to paraphrase political scientist Francis Fukuyama's idea of the end of history. This assertion is not as crazy as it might appear. Connected computers within ARPANET, the network of mainframe computers at US universities that began to be built in the late 1960s, were both





mathematics-based, device-driven history. Electrical devices should not be conflated with their electronic cousins (such as the computer), but in this context no overview of media history can miss mentioning information theorist Claude Shannon's "A Symbolic Analysis of Relay and Switching Circuits," written in 1937 as a master's thesis when Shannon was a twenty-one-year-old student at MIT in Boston. Focusing on different electrical relays (for example in telephone switchboards), Shannon's thesis combined mathematics – more specifically Boolean algebra and its logical values, *false* and *true* represented by the numbers 0 and 1 – with the logic of electronics. Essentially, Shannon showed that it was possible to use mechanical arrangements of relays to solve Boolean problems, thus making electronics as equally rule-bound and stringent as mathematics. Ever since, the binary properties of electrical switches (on and off, 1 and 0) have been used as the basis for practically everything in electronic computer design.

Most people know that the ones and zeros of the binary number system lie at the heart of computers and digital media. The binary system uses only two numerals, usually 0 and 1, with which every other number can be expressed – the number 9, for example, translates as 1 0 0 1. The binary representation of numbers has been put to practical use in computers because digital electronics can be programmed using repetitive and lightning-fast commands for on and off. Where analog electronics operate using continuous signals, digital electronics instead use discrete voltage levels in binary form – that is, clearly separated values in the form of ones and zeros. These values are called discrete because they are strictly separated from each other. Information in analog form always has intermediate points, like the varying depth of a track engraved on a phonograph cylinder, while digital information is saved as whole (separated) variables with fixed values.

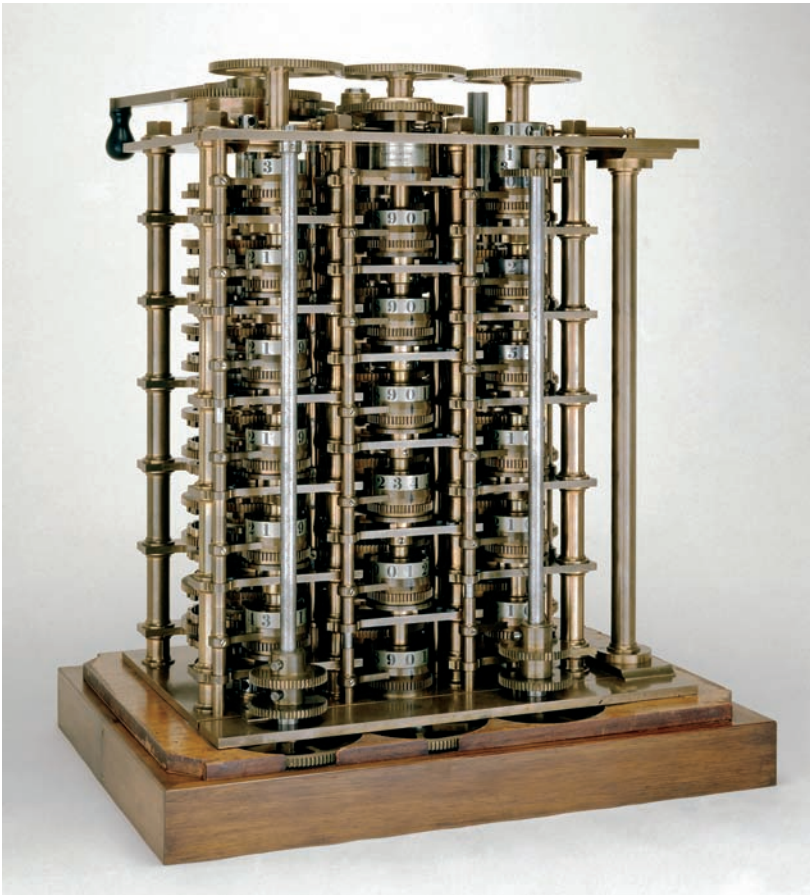
Although the term digital is now mostly associated with computers, digital systems do not necessarily have to be electronic. In fact, there have been plenty of digital media forms throughout history. The most important coding system of the nineteenth century for transferring information over long distances by electric telegraphy, Morse code, is digital, and the same is true for the optical telegraphs we have previously described. Digitization means converting something into numbers, but it is important to remember that "digital" does not automatically equate to a superior (or new) technology. A computer is a machine that can process numbers very, very quickly. But some analog technologies, for example recording music, can give better results than digital equivalents, because the latter always have to reduce

the recorded sound to discrete, whole variables. The disadvantage of analog recordings is the marked loss of quality when they are transferred or copied. In theory this does not happen with digital information in its numerical, discrete state. In contrast to continuous, analog values, digital information is based on separate, mathematical values and can (in principle) be copied with identical results.

## ■ ■ ■ Calculating Machines as Media (or Vice Versa)

A generalized history of computers could be reduced to a history of the different kinds of devices that were able to process ones and zeros. It could also be described as a shift between abstract thought experiments and concrete calculating machines. The story usually begins in the early nineteenth century with British polymath genius Charles Babbage and his Difference Engine. This machine was able to quickly work out complex mathematical tables. In the 1830s Babbage's (unfinished) Analytical Engine was intended to be an automatic-mechanical calculating machine that could be fed data using punch cards. It was for this machine that mathematician Ada Lovelace wrote the world's first computer program.

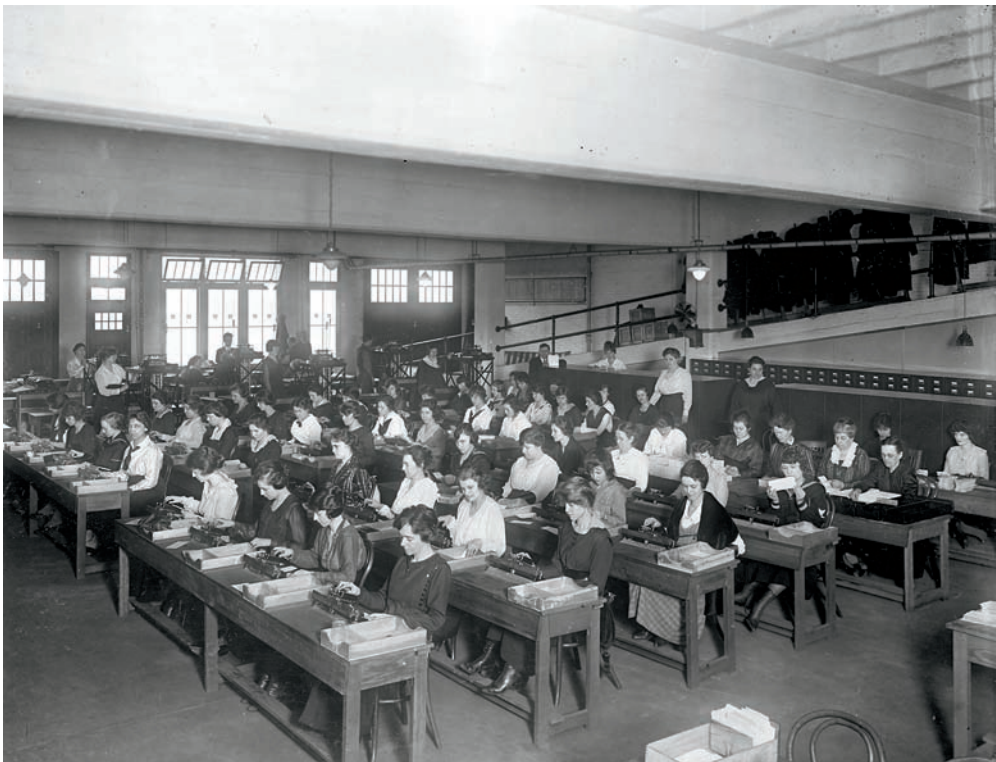
Looms and devices for weaving cloth began to be controlled by punch cards in Britain in the early nineteenth century, indicating a deep-seated history underpinning the gradual development of the computer. The history of the punch card – a stiff, perforated piece of card used as a data medium – started with American engineer Herman Hollerith. Realizing that data could be stored on cards coded with punched holes, in the 1880s he began to develop an electromechanical tabulating machine, which was of great help in producing the US population census of 1890. Hollerith's idea was to turn questionnaires into a code of standardized responses on a punch card, so that a machine could then stamp a hole for the response given. In a question about marital status, for example, which would have a specific position on the card, a perforated hole meant that the person was married; if there was no hole the person was unmarried. Hollerith's machine then used electrical impulses to read the punched cards. They were slid over a metal surface, and each hole allowed for an electrical contact that created a closed circuit. In principle, Hollerith's tabulating machine was a binary documentation system, where an electrical contact meant yes (1) and absence of contact meant no (0).



Model of (part of) Charles Babbage's calculator, the Difference Engine No. 1, which was built in the 1820s for automatic calculation of numerical tables in mathematics and astronomy. Science Museum, London.

For a long time, punch cards were the dominant data carrier during the age of electromechanical data processing – they remained in use into the 1970s as an input medium for computers. As a data medium, punch cards exhibit a historical inertia, with some functions enduring for a very long time. Punch cards were in many ways a kind of universal medium, and they also have a dark side; they were, for example, used for the registration and administration of prisoners in Nazi-German concentration camps. The history of the computer is not just bound up with these types of binary and electronic advances, however, because early analog computers existed too. One example is computing pioneer Vannevar Bush's analog Differential Analyzer, on which

1	1	3	0	2	4	10	On	S	A	C	E	a	c	e	g		EB	SB	Ch	Sy	U	Sh	Hk	Br	Rm
2	2	4	1	3	E	15	Off	IS	B	D	F	b	d	f	h		SY	X	Fp	Cn	R	X	Al	Cg	Kg
3	0	0	0	0	W	20		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
A	1	1	1	1	0	25	A	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
B	2	2	2	2	5	30	B	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
C	3	3	3	3	0	3	C	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
D	4	4	4	4	1	4	D	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
E	5	5	5	5	2		E	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
F	6	6	6	6	A	D	F	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
G	7	7	7	7	B	E	G	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
H	8	8	8	8	a		H	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
I	9	9	9	9	b	c	I	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9



A perforated punch card from the late 1890s, probably from Herman Hollerith's newly established Tabulating Machine Company. It had been formed in 1896, and ten years later the company's semi-automated punch card machines could handle 150 cards per minute. The 1905 unknown office of a "tabulating machine company" – perhaps Hollerith's – was photographed by Harris & Ewing, later to become one of the largest photographic studios in the US. Around the same time, in 1924, Hollerith's company changed its name to International Business Machines – better known in computer history as IBM. Library of Congress, Washington, DC.



Claude Shannon performed calculations in the mid-1930s. Bush's analog machine was a device that worked with continuous variables, which were represented not by (discrete) mathematical numbers, but by mechanical measurement of rotating shafts. It was nevertheless a powerful automated calculating machine, and variants of it were used both during and after the Second World War for complex calculations by the US Air Force to plot the trajectory of projectiles.

The leading example of how the modern computer first became conceptualized (and then realized) is the Turing machine. When, in 1936, Alan Turing published his article "On Computable Numbers," a text that in many ways laid the theoretical foundation for all modern computer science, his contemporary Cambridge mathematicians considered him "shockingly industrial." Turing's contribution to mathematical theory was, once again, a combination of mechanics and

In 1964, the salesman Bror Andersson, in his store Bea Data-Livs in the Stockholm suburb Fruängen, began selling more than a thousand products using punch cards. Instead of goods, the customer picked up punched cards placed under each item, which according to a newspaper article were then handed over "for processing in the computer, which prints a specified note. While the goods are produced in the warehouse, the customer buys his fresh goods. She then pays for everything at the checkout." The experiment was short-lived. Center for Business History, Stockholm.

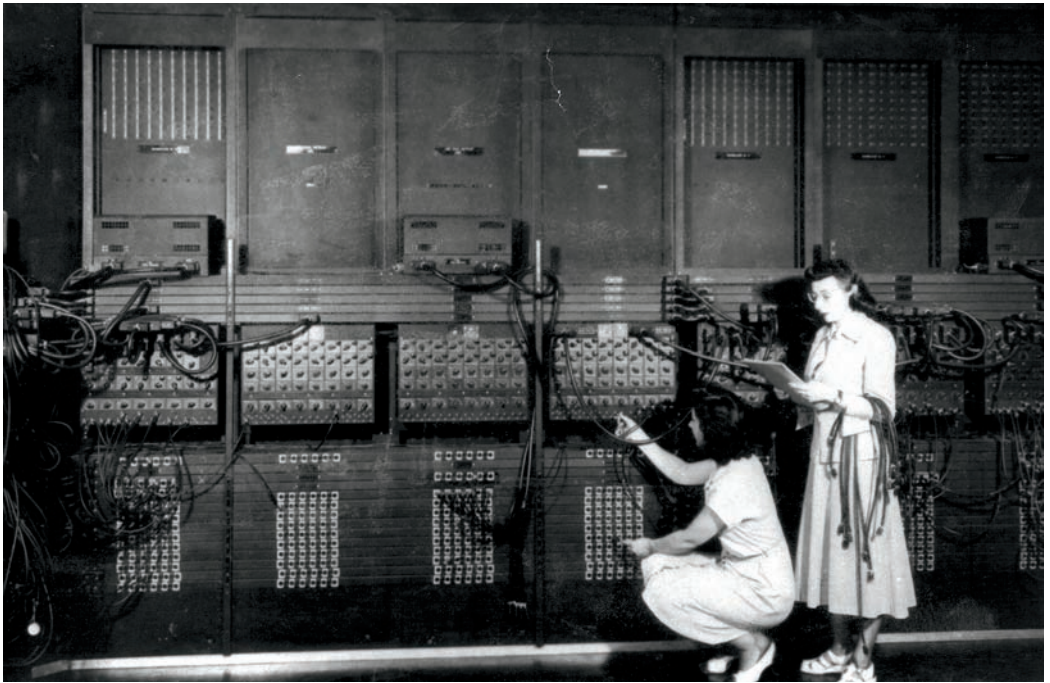




number theory. The applications, however, were endless. In principle, the Turing machine could perform every arithmetical operation that a human or a machine was capable of inventing. The Turing machine was a theoretical abstraction, or a mathematical model that reduced the logical structure of any computing device to its essentials. It was envisioned as an “automatic machine (or a-machine)” with a read/write head, which was able to read, write, and/or erase on a long strip of tape divided into squares. The strip was of arbitrary length in both directions, and when the calculation started, it contained a finite sequence of symbols (in the form of input data). Either a one or a zero was written in each step of the calculation in “the scanned square,” or it could be left empty, after which the read/write head moved one step to the left or right (or stayed still). The output of the machine – that is, the solution to a mathematical query – could be read from the strip once the machine stopped.

The Turing machine was an ingenious thought experiment, yet it incorporated all the essential features of modern information processing. When military engineers of the time began using electronics in combination with the binary system – the Second World War drove major advances in computer technology – the true potential of calculating machines soon became apparent. The very first computer is often considered to be the ENIAC, a colossal beast, with 18,000 vacuum tubes, measuring twenty-six metres in length, and weighing thirty tons. Developed at the US Army’s Ballistic Research Laboratory in 1943, ENIAC was intended to calculate artillery and projectile trajectories, but it was not actually completed until after the end of the war. Another contender for the title of the first computer is German engineer Konrad Zuse’s Z3, a fully automatic digital computer. It was built with thousands of relays, and program code was stored on punched celluloid film. Zuse built his computer at home in his Berlin apartment, and the Z3 was used by the Luftwaffe to perform calculations, just like the Allies wanted to do with ENIAC. Ironically, the Z3 was destroyed in an Allied bombing raid in 1943.

Zuse worked on his own, but it is notable that many women were involved in the maintenance, operation, programming, and running of calculations on the very first computers – a fact that is often overlooked in the history of technology and media. Six female operators worked on programming ENIAC during the war, for example. Over the course of the war, computers were usually used as ballistic calculating machines, but they were also deployed as first-class codebreakers. At



ENIAC (Electronic Numerical Integrator and Computer), developed at the University of Pennsylvania, Philadelphia, 1943–45. Esther Gerston and Gloria Ruth Gordon were early programmers working on the ENIAC computer in 1946. US Army Research Laboratory, Adelphi.

Bletchley Park, British cryptanalysts (among them Turing) constructed a huge electromechanical device, the Bombe, to work on breaking the ciphers that the German Enigma machine used for its military radio messages. Bletchley Park, which employed 9,000 people, also housed calculating machines based on vacuum tube technology, including the Colossus computer system.

ENIAC is nevertheless still considered the first general electronic computer, not least because it prompted computer scientists to consider how the technology should be developed and improved. Like radar and the atom bomb, computers were a technology that came out of the Second World War. Their development was usually a process of design and redesign, of successes, failures, and retries, all of which involved large numbers of men and women. Computer history is to a large extent the result of the collective work of many hands and minds. As observed in the book *ENIAC in Action: Making and Remaking the Modern Computer* (2016), the first computer was an assemblage of

processes and networks with both human and non-human actors, a machine of war and material artifact constantly remade by its users. The history of media and technology is regularly presented as a kind of unbroken practical work. Yet, in the case of ENIAC, a machine with thousands of vacuum tubes, cables, and a constant need for power, correcting faults and troubleshooting was a frequent undertaking.

Given all these technical problems, it is no surprise that ENIAC sparked interest in how it could be improved and simplified. Building on the collective experience from working on ENIAC, another computing pioneer, John von Neumann, suggested that a distinction should be drawn between hardware and software (although these terms came later). Improved performance required better computer memory, a simpler structure, and a different form of programming. ENIAC was coded in part using plugboards and punch cards, and in part by collecting a mass of cables. However, changing the calculation task usually took a couple of working days. Von Neumann therefore proposed the idea of storing instructions for the computer (programs) in the same way as the different kinds of input data, so one program could be treated as data by another program. Computers with stored programs would become known as von Neumann machines.

For a long time, computers were seen and used mostly as gigantic calculating machines, but by applying von Neumann's distinction, the computer's function began to be separated from its content. This led to a gradual change in the understanding of a computer's capabilities by the late 1940s. Using binary machine code (in the form of a long series of zeros and ones), it became possible to give *different* instructions to a computer. Many of the early computing pioneers also realized that there was a great deal of money to be made by anyone who could design computers with commercial and practical applications. The designers behind ENIAC, for example, set up a company for the commercial production of computers. From the 1950s, the history of computers can therefore be described in terms of the gradual development of an information technology market usually situated at the intersection between universities, state agencies, and military and commercial interests. In France, mathematician and cybernetics pioneer Louis Couffignal, together with the manufacturer Logabax, produced the first French electronic digital computer in 1952. The Netherlands saw a similar pattern; the first Dutch computers were developed at the Mathematical Centre in Amsterdam, among them the ARRA I, a device that never functioned properly. When the machine was officially introduced in 1952, it broke down and never

worked again (the ARRA II performed better). In Sweden, the military expressed a strong interest in acquiring computers, and a special government body, the Swedish Board for Computing Machinery, took up the task of developing the country's first computers at the Royal Institute of Technology: BARK (1950) and BESK (1953).

As with other media, it is possible to describe the history of computers in several ways. On the one hand, there is a technical and scientific story about vacuum tubes, relays, and transistors, which later was upgraded to focus more on software and algorithms – a technical history with a lot of complex details. On the other hand, there is a much more popular story about the economic history of computers. This is generally about the fortunes that were made (and lost), and an endless fascination with the sales and marketing of computers. The commercial computer industry dominated by the mighty IBM during

A media history of the office cannot exclude IBM's mainframes; this is an advertisement for the System 360, which was launched in the mid-1960s. It was part of a computer family designed to cover a larger area of software applications in both commercial and scientific contexts, hence the representation of both genders and white- and blue-collar workers. Flickr Commons.



the postwar years in particular – with Thomas J. Watson Sr and Jr at the helm – personifies this narrative. They pale into insignificance, however, in comparison with later IT magnates such as Steve Jobs or Bill Gates. In recent years, this story has been updated to feature all sorts of *start-ups*, where young men (and less commonly women) earn millions of dollars from some new internet service or sell it and cash in even more money.

Yet, it is also possible to single out a more visionary history of computers with a focus on innovations and new computational thinking, a kind of history of computing ideas. For the American computer science pioneers Douglas Engelbart, Alan Kay, and Ted Nelson, IBM was the big villain in the 1960s – sarcastically referred to as *Big Blue* because of its blue logo – since the company had (then) no idea of the social and cultural potential offered by computers. These computer visionaries harboured a hippie-inspired, almost revolutionary faith in the possibilities of the computer and digital technology. In the 1960s, Engelbart invented both the computer mouse and *bitmaps*, the processing of computer graphics using rectangular grids of pixels. In 1974, Nelson published his book *Computer Lib*, an illustrious blend of computer manifesto, polemic, and techno-utopian vision. At the time, he was utterly convinced that computers would be the dream machines of the future and he wrote about both “hypertext” and “hypermedia.”

These and many other computer pioneers were technological determinists in the sense that their faith (not to mention trust) in modern computer science was resolute. A sharp contrast to this description of computing history can be found in a more critical attitude to computers, which saw them as ultimately dehumanizing. Science fiction of the late twentieth century was awash with computer-based dystopias. One example is Olof Johannesson’s book *The Great Computer* (1968). Its narrative focused on a future in which computers had completely taken over; the satirical book was about humanity’s gradual marginalization and the handing over of the capacity for thought to computers. The fact that the narrator was one of these computers, and that (later) Nobel laureate in physics Hannes Alfvén had written the book under a pseudonym, gave the story added dimensions. Yet, the most famous of all the postwar dystopian computers remains the malicious and suggestive supercomputer HAL in Arthur C. Clarke’s book and Stanley Kubrick’s film *2001: A Space Odyssey* (1968). Despite the genius combination of letters that meant it would always be better and one step ahead of IBM – the letter H comes before I, and so on – HAL eventually ran amok and killed the crew of the spaceship.



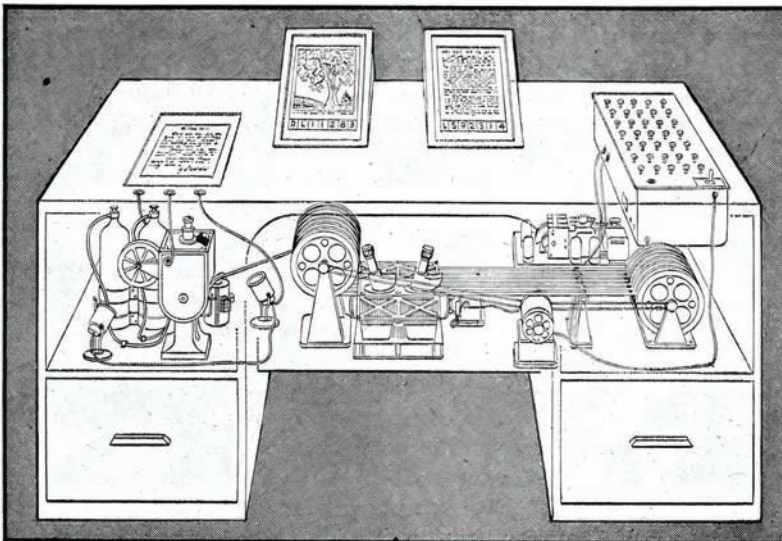
## Memex, Infrastructures, and Networks



From the 1950s onwards, the von Neumann architecture stipulated that a computer should be programmable, not hard coded as before using cables and relays. Data and programs were to be read (as machine code) and stored in the computer's memory so that they could be used in different situations and for different tasks. As a consequence, it gradually became apparent that, rather than just being numerical machines, computers could be used for other purposes, such as information management. One of the earliest ideas was put forward by Vannevar Bush, who, as well as being a computer pioneer, worked as a science administrator and national research adviser, with partial responsibility for the secret Manhattan project and the production of the first atom bomb.

In 1945, Bush published a visionary and influential article in which he unveiled the hypothetical Memex device (yet another computational thought experiment) with a focus on how the new technology could be used for information searches. The Memex can best be described as a

An all-knowing device – Vannevar Bush's Memex machine, with two monitors, buttons as controls, and microfilm projection. The image was originally published in *Life* magazine in 1945. Wikimedia Commons.



**MEMEX** in the form of a desk would instantly bring files and material on any subject to the operator's fingertips. Slanting translucent viewing screens magnify supermicrofilm filed by code numbers. At left is a mechanism which automatically photographs longhand notes, pictures and letters, then files them in the desk for future reference.

kind of advanced microfilm reader with thousands of reels of photographed knowledge. Like the Turing machine, the Memex was an *imaginary* device that would link microfilmed information in books and newspapers, notes and letters via what we would now call hyperlinks. As such, the Memex has often been considered a kind of forerunner of today's web. The Memex was also a mechanical attempt (albeit in the abstract) in scalable form to master and tackle rising concerns about a surplus of information. As a research administrator, Bush was worried by how knowledge and scientific data were becoming unmanageable – a cumbersome worry indeed, albeit not the first time in history that an intellectual had agonized over information overload (and certainly not the last). Bush expressed a fear that important knowledge would be lost in an almost banal way, because no one could find the data or information they needed. He pointed out, for example, that Austrian monk Gregor Mendel's genetic experiments with pea varieties from the 1860s had long been lost to posterity because the results had not been distributed properly. With the Memex, linked information and modern computer technology, such mistakes should never be repeated.

Although the Memex was a hypothetical machine, it pulled together various strands of computational thinking on information management. It was obvious that computers could count, but in 1945 it remained unclear how exactly they could manage information. For a number of US companies such as IBM, AT&T, and General Electric, the primary use of the modern computer was numerical calculation. Yet, information management gradually began to take centre stage. According to McLuhan, who characterized this period as “the new electric Age of Information,” in the 1950s these companies began to focus on “the business of moving information,” as he put it.

Although commercial interests, led by IBM, took over the design and production of computers after the war, the new computational infrastructure was not provided by the business world. It was rather the military, defence industry, and universities in the US that laid the foundations for the way computers began to be linked to one other. Researchers connected to various terminals via mainframe computers (through something called time sharing). The versatile mainframe computers were able to perform many different tasks, while the terminal computers were unable even to run common computer software. However, as advances were made in the design of computers, researchers at different educational institutions began connecting them together, with the US Defense Department providing funding to

make the initial infrastructure robust and secure. The Cold War had intensified once the Soviet Union began to lead the space race – the Sputnik satellite was shot into orbit in 1957. Hence the US Defense Advanced Research Projects Agency (DARPA) became a significant financial backer of the initial computer infrastructure. Within the hyper-commercial corporate culture that now defines Silicon Valley, little is said about the fact that the first, and greatest, venture capitalist in computer history was the US state. IT culture in Silicon Valley was built with taxpayers' money.

The basis for the internet – or ARPANET (Advanced Research Projects Agency Network) as it was initially known – was a commission from the US Defense Department to connect computer environments at American universities into a decentralized network (in order to reduce the system's vulnerability). The origin of the internet is thus full of interesting contradictions. The scientific need for transparency stood in opposition to the closed nature of the military industrial complex. The internet's growth was therefore the result of both science's need to share information and the military's secretiveness. ARPANET arose from a kind of Cold War–driven balancing act between military and academic wishes. And if ARPANET was related to the Cold War, the introduction of the World Wide Web in the early 1990s was to some extent the consequence of that war ending. The internet was initially American, but the web took shape in Europe. Some media scholars have linked this development to the tradition of public service broadcasting that long prevailed in Europe.

A book on media history (like this one) will never fail to mention the invention of the internet, and the subsequent linking together of computers in the postwar years, since the net has become the most prominent communication form of our age. Yet at the time, very few people knew anything about this kind of computer network. Swedish newspapers, for example, never mentioned the ARPANET or the internet prior to 1988. And when they did, the first article about the “research data network” was gloomy since a “computer virus” had spread across the network. “Programs that can be smuggled in by telephones or computer discs, hidden among other data ... are called viruses because they quickly multiply and spread from computer to computer like a biological virus infects different people.”

In fact, during the 1960s and '70s, the word network was more closely associated with telecommunications systems used to distribute TV signals over large geographical areas in the form of cable television. Telecommunications usually means the transmission of

sound and images (and later also data) via different kinds of media such as metallic conductors in the telephone network or radio waves in the ether. Telecommunications thus covers systems for telephony, television and radio, data communications, and positioning systems. Before separate networks were constructed for data transmission (like ARPANET), data could be transferred over the telephone network via a modem, a device that was introduced in 1962. Via the analog telecommunications network, the modem converted a series of binary figures into audio signals for data communication. The data transfer speed was slow to start with, and for many years there existed a commercial imperative to make modems faster. The 14.4 kbit/s modems that later became common among the first users of the web (in the early 1990s) were, however, still not particularly fast; data transfer at the speed of 14,400 bits per second felt painfully slow (as some of us remember).

Cable TV was another kind of media network that first developed in the US during the postwar years and then spread to many other countries. This distribution form was prompted by difficulties in securing effective broadcasting over the airwaves in some geographical areas. From a shared television antenna with good reception, a cable could instead be run to individual households, and entrepreneurs quickly realized that through cable TV they could offer substantial multichannel packages. By the end of the 1950s, a twelve-channel system was operating on the US market, and by purchasing the rights to films and TV programs from Hollywood's production companies, cable TV companies were soon able to offer a form of pay TV. When, in 1961, the CEO of the Swedish Film Institute, Harry Schein, addressed the Swedish film club's spring meeting – he had just returned from Hollywood where his wife, actress Ingrid Thulin, had been shooting with Vincente Minnelli; she was one of the stars of *The 4 Horsemen of the Apocalypse* (1962) – Schein spoke about the new phenomenon of pay television:

Pay TV, which has yet to be rolled out on a large scale, is a television network that is connected to the telephone system, has no commercials but shows programs with high production values. Those who want to watch the evening's programs either put a few coins in the television meter, or viewing is recorded on the meter, which is then read, and the person is billed just as they would be for their telephone usage or electricity. Pay TV has obvious benefits for Hollywood; a fully expanded television network means that a feature film could be shown in 20 million

homes in just one evening. The production costs for even the most lavish films could then be recouped – and a profit made – in a single evening.

Schein – a prolific figure in Swedish media history – wrote a report in 1972 for the Swedish Ministry of Education on the future of cable television. But he dedicated twice as much space to satellite technology as to computer technology and also wrote very little about networks of computers, despite a successful public demonstration of ARPANET occurring the same year. The year 1972 also saw the production of the information film *Computer Networks* that contained interviews with several American internet pioneers. The film is today accessible on YouTube or the Internet Archive.

Suffice to say, it was in parallel with various forms of telecommunications and cable TV that the specific ARPANET data network emerged. As was the case with telecommunications, the spotlight was on the technology (rather than the content) in the net's early history. One focus was on enabling computers to communicate with each other remotely via communication protocols; one of these protocols made it possible to begin sending electronic mail. The first email was sent in 1971, and just two years later it was estimated that emails made up 75 per cent of all the traffic on ARPANET. The specific @ symbol was used for email right from the outset; it was an arbitrary choice, made mostly because the symbol was not much used in communications between computers at the time.

Claude Shannon had already written about communication that was independent of semantic content, and the same was true for information exchange on the new network, because it was primarily about communication between machines. ARPANET comprised various communicative layers and was in principle both dumb and blind; the task was to push the data in the right direction with the help of communication protocols that broke down the information into parcels of data that were addressed to reach a particular machine. Computer scientist Vint Cerf is sometimes referred to as the Father of the Internet, because in 1974 he set the ground rules for how data and information should be sent on ARPANET by establishing an architecture for data communications, divided into different layers. In his proposal, Cerf (and others) sketched out the contours of a universal communications program, TCP (Transmission Control Program), which remains the standard, and now goes by the name of TCP/IP. Cerf's proposal was memo number 675 in the *Request for Comments* (RFC). Although the



Network Working Group  
Request for Comments: 706  
NIC #33861

Jon Postel (SRI-ARC)  
Nov 1975

### On the Junk Mail Problem

In the ARPA Network Host/IMP interface protocol there is no mechanism for the Host to selectively refuse messages. This means that a Host which desires to receive some particular messages must read all messages addressed to it. Such a Host could be sent many messages by a malfunctioning Host. This would constitute a denial of service to the normal users of this Host. Both the local users and the network communication could suffer. The services denied are the processor time consumed in examining the undesired messages and rejecting them, and the loss of network thrupt or increased delay due to the unnecessary busyness of the network.

It would be useful for a Host to be able to decline messages from sources it believes are misbehaving or are simply annoying. If the Host/IMP interface protocol allowed the Host to say to the IMP "refuse messages from Host X", the IMPs could discard the unwanted messages at their earliest opportunity returning a "refused" notice to the offending Host.

How the IMPs might do this is an open issue -- here are two possibilities:

The destination IMP would keep a list (per local Host) of sources to refuse (this has the disadvantage of keeping the network busy).

The destination IMP on receiving the "refuse messages from Host X" message forwards the message to the source IMP (the IMP local to Host X). That IMP keeps a list (per local Host) of destinations that are refusing messages from this source Host.

This restriction on messages might be removed by a destination Host either by sending a "accept messages from Host X" message to the IMP, or by resetting its Host/IMP interface.

A Host might make use of such a facility by measuring, per source, the number of undesired messages per unit time, if this measure exceeds a threshold then the Host could issue the "refuse messages from Host X" message to the IMP.

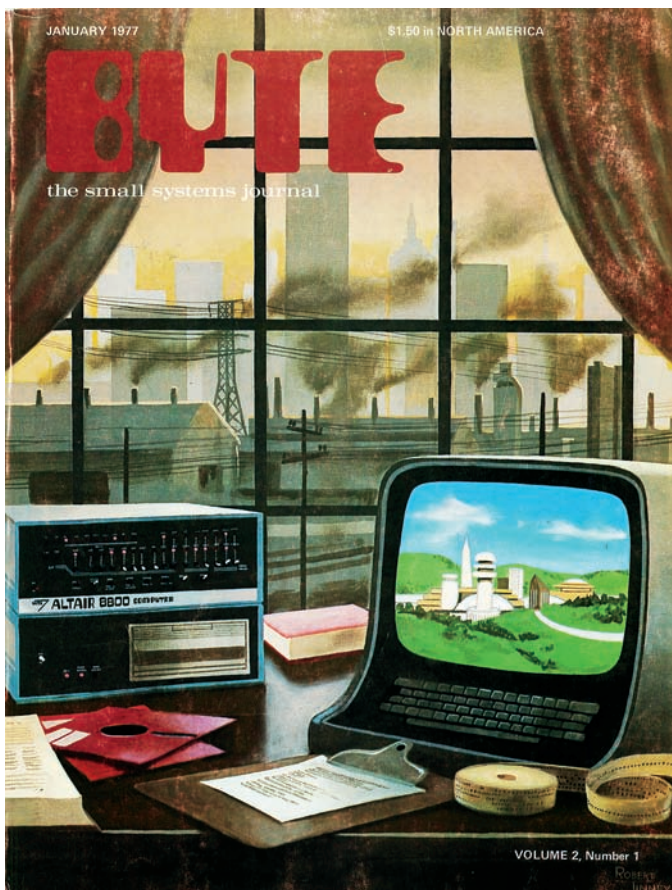
Even spam has a media history and appears to be an integral part of all data communication. RFC protocol 706 from November 1975, "On the Junk Mail Problem." Rfc-editor.org.

name may seem odd, these literal requests are the most important documents in the history of how the internet developed as a universal network. The series of RFCs began in 1969, and they contain almost everything to do with the workings of the internet. The RFC format always followed a similar pattern: first a proposal was submitted to the administrators in the Network Working Group, then came an analysis and observation as to whether the memorandum would be used, and finally feedback was given on how it should be revised or amended. RFC 114 from 1971, for example, attempted to facilitate the sharing of files through the establishment of a File Transfer Protocol (FTP) – still in use on FTP servers for large files. RFC 706 from 1975 was about misuse of technology: “On the Junk Mail Problem,” written by internet pioneer Jon Postel, complaining about the improper ways that ARPANET was being used. At the time there was no protocol that enabled users to filter out or reject emails. Many people in ARPANET circles were also upset that protests against the Vietnam War were being sent over the network, as they considered this inappropriate. Postel’s ideal was to be conservative in what you send, but liberal in what you accept. Given today’s debates about anonymous comments online, fake news, and internet trolls, it is worth remembering that collective self-regulation was a founding tenet of how communication over networks should function and that spam has a long history. The RFC memoranda nevertheless provide valuable insights into the way the net took shape and also into the rather unique internet culture that the programmers of the time created. In early internet culture, the programmer was often a radical visionary, a hacker who saw the computer as a tool for open access to information. The term *computer geek* also quickly gained currency – and the online archive of RFCs contains plenty of memoranda of a more obscure nature, such as RFC 2324, “Hyper Text Coffee Pot Control Protocol,” regulating how coffee pots should be controlled over networks.

## Breakthrough of the PC



In the late 1970s, the development of computer networks took an alternative turn, bound up with the advent of personal computers, which made it possible to use different kinds of networks outside a military or academic context. ARPANET remained the most central network of connected computers, but other, almost hippie-inspired, grassroots networks appeared towards the end of the 1970s, using the telephone



Personal computers were destined to become a future technological sublime, in contrast to a grimy industrial past. Cover of *Byte: The Small Systems Journal*, January 1977.

system. A typical American computing subculture saw the establishment of networks such as Usenet (1979) and virtual spaces and discussion forums such as the WELL (Whole Earth 'Lectronic Link) in 1985. It was in this weird and wonderful amateurist hobby culture that companies such as Microsoft and Apple took shape, with their mixture of commercial interests and alternative, do-it-yourself attitudes.

Apple was founded in 1977 by Steve Wozniak (who was interested in electronics) and Steve Jobs (a previous employee of the video game company Atari). It was Wozniak who designed the first Apple computer. Jobs's main task was to try and sell it. Only a glance at the Apple I and its rudimentary circuitry is enough to see that it was a DIY build. It was demonstrated at the Homebrew Computer Club in Palo Alto, California, set up by a group of local computer and electronics enthusiasts, but less than 200 units of Apple I were sold. The Homebrew Computer Club is an excellent example of how the early personal

computer developed. The club members were keen to share practical tips and concrete advice on how computers could be put together, and what programs could be run on them, while a newsletter provided information on all the latest developments. There was initially a great deal of focus on the Altair microcomputer, which was designed in 1974. The programming language Altair BASIC was written for this computer – the very first product of Micro-Soft, as the company name was spelled at the time.

Microsoft was set up in 1975 by Bill Gates and Paul G. Allen (another two young men), as a software company rooted in the old von Neumann architecture, which stipulated that personal computers should also be programmable. That required computer programs and reliable operating systems – the software – and Gates was already a very talented programmer with the ability to produce effective and reliable code. In other words, by the mid-1970s there was a differentiation between those who built hardware and personal computers (like Apple) and companies that produced software (like Microsoft). California's hippie culture added a kind of techno-philosophical backdrop to the development of personal computers in the late 1970s and early '80s. The sharing of files and programs, for example, was already much

In 2010 an original motherboard for an Apple I computer, including printed wrappers and original company logo, was sold at Christies for US\$180,000. Christies.com.





debated, and it is hardly surprising that commercial interests and alternative practitioners would soon end up on a collision course. Gates famously wrote “An open letter to hobbyists” in 1976, expressing his irritation that the amateurs in the Homebrew Computer Club failed to pay him any royalties for the computer programs he had written. “As the majority of hobbyists must be aware, most of you steal your software. Hardware must be paid for, but software is something to share. Who cares if the people who worked on it get paid? Is this fair?”

The computer whizzes at the Homebrew Computer Club took much of their inspiration from the American computer visionaries of the 1960s, and most of them were averse to the regulation of computer programs. Nevertheless, Gates’s objections were entirely reasonable, especially considering the obvious economic potential in the products now being launched, such as Apple’s first commercially marketed model, the Apple II from 1977. In alternative hacker circles, Gates and Microsoft would never receive any great appreciation for their products, and the same applied to Apple, though to a lesser extent. Microsoft quickly became one of the runaway successes among software companies when IBM chose Microsoft’s operating system MS-DOS for the PC that was launched in 1981. The rapid spread of IBM-compatible personal computers turned the operating system into a kind of standard, and paradoxically the copyability of the software that Microsoft produced contributed to the general breakthrough of the personal computer.

To start with, the Apple II had an open-source system, allowing for the production of third-party software. But Apple II was primarily aimed at a consumer market of American households (rather than businessmen or computer hobbyists). Jobs also gained a reputation as a genius and a control freak, which is why the production of Apple’s computers was subject to rigorous controls and internal perfectionism. In 1984 the company launched its first Mac computer, the marketing for which included a prominent TV commercial, first shown in the US during the Super Bowl to reach as large an audience as possible. The commercial in an Orwellian scene featured a woman throwing a sledgehammer at the omnipresent Big Brother, IBM, which dominated the computer market. The clever tagline, “And you’ll see why 1984 won’t be like 1984,” indicated that with its new personal home computers, Apple was about to revolutionize computer use – which, eventually, the company succeeded in doing.

The way in which Apple transformed personal computing was, however, less about performance and more about appearance. From





## You've just run out of excuses for not owning a personal computer.

Clear the kitchen table. Bring in the color TV. Plug in your new Apple II and connect any standard cassette recorder/player. Now you're ready for an evening of discovery in the new world of personal computers. Only Apple II makes it that easy. It's a

complete, ready to use computer, not a kit. At \$1298, it includes video graphics in 16 colors. It includes 8K bytes ROM and 4K bytes RAM—easily expandable to 48K bytes using 16K RAMs (see box). But you don't even need to know a RAM from a ROM to use and enjoy Apple II. For example, it's the first personal computer with a fast version of BASIC permanently stored in ROM. That means you can begin writing your own programs the first evening, even if you've had no previous computer experience.

The familiar typewriter-style keyboard makes it easy to enter your instructions. And your programs can be stored on—and retrieved from—audio cassettes, using the built-in

cassette interface, so you can swap with other Apple II users.

You can create dazzling color displays using the unique color graphics commands in Apple BASIC. Write simple programs to display beautiful haiku-like designs. Or invent your own games. Games like PONG—using the game paddles supplied. You can even add the dimension of sound through Apple II's built-in speaker.

But Apple II is more than an advanced, infinitely flexible game machine. Use it to teach your children arithmetic, or spelling for instance. Apple II makes learning fun.

Apple II can also manage household finances, chart the stock market or index recipes, record collections, even control your home environment.

Right now, we're finalizing a peripheral board that will slide into one of the eight available motherboard slots and enable you to compose music electronically. And there will be other peripherals announced soon to allow your

Apple II to talk with another Apple II, or to interface to a printer or teletype.

Apple II is designed to grow with you as your skill and experience with computers grows. It is the state of the art in personal computing today, and compatible upgrades and peripherals will keep Apple II in the forefront for years to come.

Write us today for our detailed brochure and order form. Or call us for the name and address of the Apple II dealer nearest you. (408) 956-1010. Apple Computer Inc., 20565 Stevens Creek Boulevard, Bldg. B3-C, Cupertino, California 95014.



Apple II™ is a completely self-contained computer system with BASIC in ROM, color graphics, ASCII keyboard, lightweight, efficient switching power supply and modulated case. It is supplied with BASIC in ROM, up to 48K bytes of RAM, and with cassette tape, video and game I/O interfaces built-in. Also included are two game paddles and a demonstration cassette.

### SPECIFICATIONS

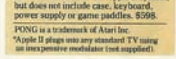
- Microprocessor: 6502 (1 MHz)
- Video Display: Memory mapped, 5 inches—all Software-selectable:
  - Text—40 characters/line, 24 lines upper case.
  - Color graphics—40h x 48v, 16 colors
  - High-resolution graphics—280h x 320v, black, white, violet, green (12K RAM minimum required)
- Both graphics modes can be selected to include 4 lines of text at the bottom of the display area.
- Completely transparent memory access. All color generation done digitally.

- Memory: up to 48K bytes on-board RAM (4K supplied)
  - Uses either 4K or new 16K dynamic memory chips
  - Up to 12K ROM (8K supplied)
- Software:
  - Fast extended BASIC in ROM with color graphics commands
  - Extensive monitor in ROM

- I/O:
  - 1500 baud cassette interface
  - 8-bit motherboard
  - Apple game I/O connector
  - ASCII keyboard over
  - Speaker
  - Composite video
  - output

- Apple II is also available in board-only form for the do-it-yourself hobbyist. Has all of the features of the Apple II system, but does not include case, keyboard, power supply or game paddles. \$399.

PONG is a trademark of Atari Inc. \*Apple II plugs into any standard TV using an inexpensive modulator (not supplied).



apple computer inc.

Circle 372 on inquiry card.

Print advertisement for the Apple II computer in *Byte*, June 1977. *Byte: The Small Systems Journal*, June 1977.

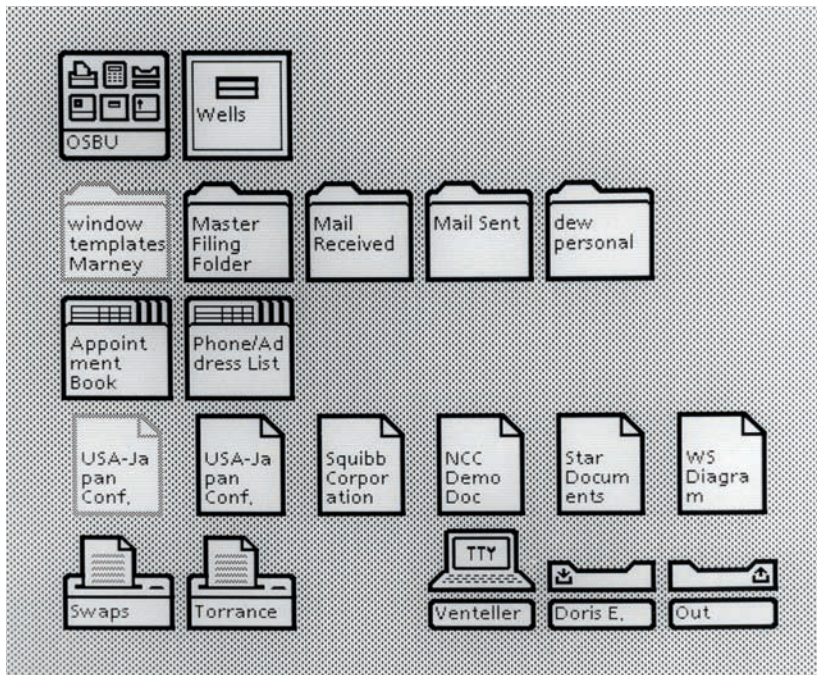
the mid-1980s, the key feature in the marketing of computers was no longer capacity, circuitry, and microprocessors but their *graphical user interface* (GUI). Graphical operating systems for computers applying the WYSIWYG principle (What You See Is What You Get) were first developed at the Xerox PARC research centre in California in the early 1970s. The photocopier company Xerox financed a computer lab, a historical irony considering that computers could (in theory) make copiers superfluous. Computer visionary Douglas Engelbart was one of the pioneers working at Xerox PARC, where in 1973 they built (for research purposes) what is often considered the very first personal computer, Xerox Alto, which was controlled by a computer mouse and had a graphical user interface based on the desktop metaphor.

Most PCs in the 1980s would come to use the graphical user interface, but Apple spearheaded the development in making graphic icons on the computer screen into virtual everyday objects in the lives of millions of people. (A computer-generated virtual reality also took shape around this time, often linked to the video games industry.)

Graphic elements, such as the recycle bin for discarded files, served as analogies to objects in the real world, although many of them were quite unrecognizable, such as the symbol for an office folder. In its rudimentary form, it was far from clear that you were supposed to place documents in it, but users became accustomed to it and folders still basically look the same today.

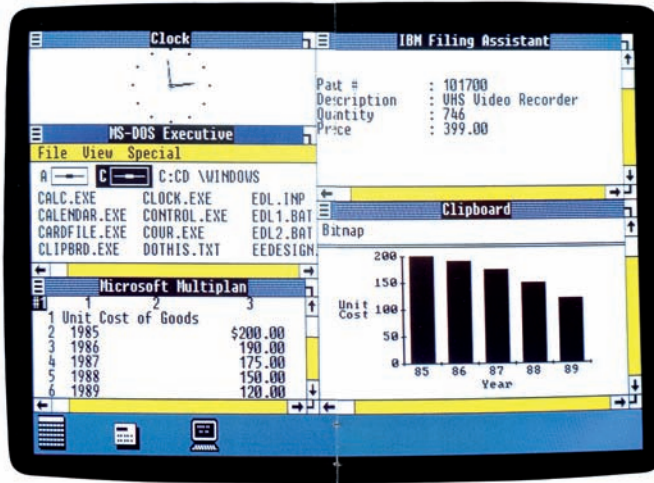
During the 1980s, users learned to operate their PCs via a screen-based interface, and the operating system – the control systems and programs that dealt with the computer's inner workings – also came to be handled through a graphical user interface. The screen became a kind of window into the computer; Microsoft's decision in 1985 to call its operating system Microsoft Windows says it all. However, as so often in media history, the revolution was not immediate. The point is often made that in the 1980s Apple's computers were of higher quality, but the PC market grew more rapidly, as companies such as Compaq and later Hewlett-Packard and Dell began to sell PC-compatible computers with Microsoft's operating system and software. When

Graphical user interface (GUI) of the Xerox Star computer from 1981 – conceptually based on the Xerox Alto, the first computer designed to support an operating system based on a GUI. Wikimedia Commons.





# It's going to open your eyes.



Microsoft® Windows has arrived. For anyone who uses a computer in earnest, that is extremely good news.

Windows gives you a practical way to integrate programs. It radically decreases the time it takes to move from one application to another. Dramatically simplifies the means of consolidating data from many different programs.

And, as a graphical extension of the MS-DOS® operating system, it gives you a highly visual way to work and to organize your work.

In short, Windows brings efficiency to all those processes of personal computing which have till now been awkward, unwieldy, inconvenient.

### The joys of job hopping.

With the advent of Windows, you can work with multiple applications. And switch from program to program with ease.

Start up with one application, then another, and another. Leap back and forth between applications as your work routine dictates. Then pick up right where you left off.

The ability of Windows to change quickly from program to program logically and naturally magnifies the utility and productivity of the personal computer. And is a

recognition of the way people who exploit the power of PCs really do their jobs.

### Breaking the 640K barrier.

Just like you, Microsoft Windows can handle several projects at the same time. Juggle assignments. Deal with frequent interruptions.

And Windows will ignore the 640K limit of your PC, especially if you have a hard disk, the Intel® Above™ Board, or expanded memory. It will execute the rather neat trick of working with more programs than memory can hold at one time.

### Spreading knowledge.

Another great service Windows performs is accelerating the movement of information from one program to another.

Collecting and combining that information is as simple as taking a "snapshot" of data in one program. Editing it. Then consolidating it with data from other programs.

With Windows, you can enjoy the advantages of conventional integrated programs without their compromises. Because Windows lets you put together the applications that you know, and that get a job

done for you.

Choose your best word processor, spreadsheet, database—you name it. They're all there for you at a keystroke.

### Common ground.

Finally, Windows is not only an immensely powerful tool for today, it's also a solid base for a new generation of Windows applications.

As an introductory offer, two of these—Microsoft Windows Write and Paint—are included in the package. Along with more than a dozen other programs.

In Windows applications you have a common interface which includes drop-down menus, dialog boxes, icons. Along

with a richer environment that allows you to mix pictures and text. And to summon different type faces and styles at a keystroke.

Windows is a bridge between today's applications and the graphics based software now evolving. A way to work interchangeably with today's programs. And tomorrow's.

If you're someone who uses personal computing as a natural part of your work life, who capitalizes on the productive powers of sophisticated applications, look into Windows, a new vision of what a computer can do.

Microsoft Windows was released in 1985 and marketed with the brochure *Microsoft Introduces Power Windows*. Wikimedia Commons.

the operating system Microsoft Windows 3.0 was launched in 1990, it made an enormous commercial breakthrough, particularly in the office sector. The software offerings also included the aptly named Microsoft Office, with (later) well-known programs such as Microsoft Word, Microsoft Excel, and Microsoft PowerPoint.

While office machines had previously been synonymous with calculators and typewriters, the personal computer quickly rewrote the rules in most offices. A computer and a telephone were the media that now characterized the modern workplace, and word processing became the most common way that people used computers as a tool. Microsoft Windows 3.0 is also an interesting example of how, during this period, software upgrades became the computer industry's way of earning money. Software was beginning to come out in different versions that included new functions (with novel appearances,

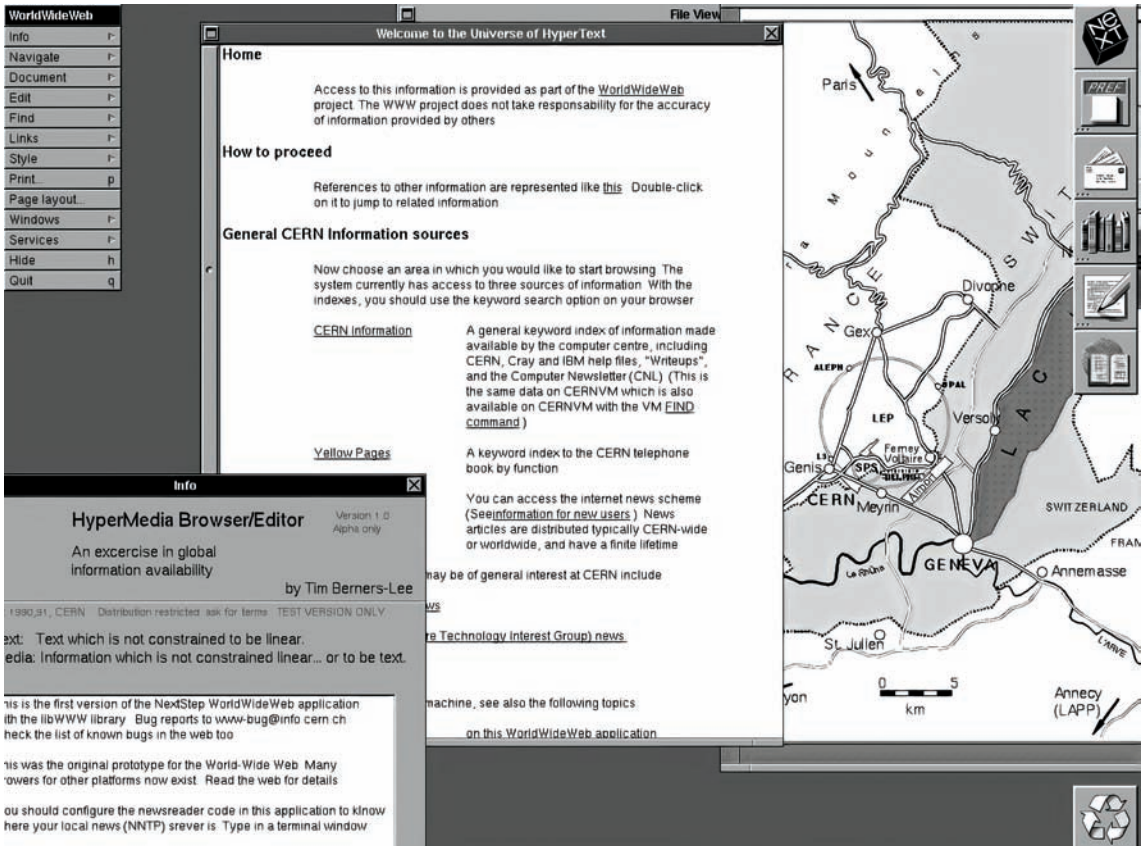
particularly in Apple's case). Bill Gates may have been angry about how his computer programs were copied in 1975, but fifteen years later the software market was relatively well developed. Customers bought licences that gave permission to use software (including a description of what the user could and could not do with it). Microsoft decided early on to make its software backwards compatible, which meant that older program files could still be run on them. Together with a low price, this paved the way for the company's meteoric successes in the 1990s, when it became the market leader and, in many ways, created a kind of global standard in the ever-expanding PC market.

In the 1980s, as a reaction to the rising cost of software (which by its nature was *always* copyable), a movement began for free software, which later developed into various forms of open source and creative commons licences. Software had been widely shared over ARPANET, but as the personal computer generated both a business-driven and a private consumer market for computers and software, it was considered not commercially viable to let people freely share the merchandise. "Information wants to be free" became the battle cry of Stewart Brand, one of the pioneers of the IT culture in Silicon Valley, a geographical term that became common in the 1980s. He was the one who had set up the WELL discussion forum, and Brand personified the tension in the history of computerization between free and controlled information, between the sharing of software and its commercial potential, between creating and spreading information – something that would be accentuated as the web made its breakthrough in the mid-1990s.



## World Wide Web

Between 1985 and 1995, the personal computer was, for most people, a kind of advanced typewriter, and to others a (more or less) rudimentary gaming machine. Yet, when computers came to be associated with and linked to digital communication, they gained the status of the most significant media form of our age. The backdrop to this development was a communication protocol that British computer scientist Tim Berners-Lee developed in the early 1990s, a "hypertext project" that was eventually called World Wide Web. A few years earlier, the ARPANET had switched to using only the TCP/IP protocol suite, in which each computer was assigned its own IP address. From 1983 people had therefore begun to talk about this network of computers as



The screenshot was taken from a NeXT computer running Tim Berners-Lee's original World Wide Web browser in 1990. The first browser was also an editor, making the web an interactive medium – but the problem back then was that it ran only on the NeXTStep operating system. CERN, Geneva.

an internet. Berners-Lee was working at the European research centre CERN, which was connected to this internet. His World Wide Web was intended as a system for distributing research reports, since with many references and citations it was natural to see them as a collection of linkable hypertexts. Berners-Lee therefore invented a protocol for so-called web pages and a web browser that enabled users to navigate between them by clicking on different hyperlinks.

From the outset, the web was thus a research network (just like ARPANET), but many immediately saw the potential to make other forms of information available and link them together. The web was, above all, interactive. The structure was based on the users being able to add new web pages – by 1992 there were already half a million of





## *The Network Age* | MANUEL CASTELLS

One of the leading interpreters of the network age is Spanish sociologist Manuel Castells. In three substantial volumes, *The Information Age: Economy, Society and Culture*, published between 1996 and 1998, he describes how network structures took shape within business, the organization of work, politics, and media, following the emergence of the new information technology in the 1970s. Once hailed as the Karl Marx of our age, Castells is a Marxist who draws on Harold Innis and Marshall McLuhan.

Like Marx, Castells thinks that the mode and relations of production determine how the whole of society operates. But instead of machines in factories, Castells sees information technology as the “material basis of society.” Network structures have been around forever, but from the latter part of the twentieth century the increased speed of communications has meant that nodes can be in direct contact with each other wherever they are located. This created new opportunities for companies to collaborate and to outsource manufacturing, marketing, and other functions. At the same time, partnerships and contracts could be ended as quickly as they began – if other arrangements proved more beneficial.

Power in the network age is the power to control the flow of information and capital, and the ability to set the terms of connection. Castells sees power structures as less hierarchical than industrial society’s forms of governance. But those who want to connect – and stay connected – must adjust to the internal rules of the network. Remaining outside is not an option if you want to continue to run a company, work, or keep yourself informed. Flexibility becomes

the mantra – simultaneously liberating and coercive.

Castells discerns network structures in many different contexts: the chain of suppliers producing car parts for Toyota; terrorists and crime syndicates that organize themselves into loosely connected cells; groups of individual users who produce and exchange content on the internet; the organization of work in the form of projects and project-based employment. Those who protest the economic order paradoxically organize themselves into networks that are structurally reminiscent of the financial networks they want to challenge. As a Marxist, Castells has high hopes for the social movements that flourish amid digital diversity. He is, however, less optimistic about the future of traditional politics within the framework of the nation-state. Once economic networks have become global, it is difficult for governments to regulate their flows.

More than two decades after Castells offered his diagnosis of the times, many of his observations remain true. Today, there are network structures everywhere. But he may have overestimated the decentralized diversity of digital networks, while also underestimating the power that was concentrated in central digital nodes. In 2021, Uber is the world’s largest taxi company, but it doesn’t own any cars. Spotify is the leading music streaming platform without producing any music. Amazon sets the agenda for reading habits but doesn’t publish any books. Digital flows are often dominated by single, large-scale corporations that offer the network access on which other actors have come to rely, from consumers and users to manufacturers and suppliers.

them. So-called homepages entered the lexicons in the early 1990s as a description of a start page on the web.

The rise of ARPANET and the web were both based on the principle of *sharing*. Before the launch of the first user-friendly web browser, Mosaic, in 1993, web pages contained mostly just text. If an image needed to be viewed, it could be opened in a new window via a link. Berners-Lee nevertheless anticipated later developments in assuring that information on web pages *could* be multimedial. With Mosaic, it became possible to *surf* the web for the first time; water metaphors for the internet would continue to proliferate (file sharing in a bay, streaming media, cloud computing). That same year, 1993, Eric Schmidt (who would later become CEO of Google) stated that “when the network becomes as fast as the processor, the computer hollows out and spreads across the network.” At the same time, the computer company that Schmidt ran, Sun Microsystems, marketed itself with the message that “the network is the computer.” This was something of an exaggeration; the network could hardly beat your computer when a 28.8 kbit/s modem kept you staring at a blank screen for several minutes, waiting for a website to load. Before Netscape Navigator, web browsers were unable to display any information until *all* data had been loaded.

With the advent of web browsers such as Netscape Navigator and Internet Explorer the personal computer went from being an advanced typewriter to a medium for interactive communication. The statements from Schmidt and Sun Microsystems proved prophetic, as the web (in theory) meant that practically all personal computers could be linked together, or rather could connect to “the net.” Technically speaking, using the word net here is incorrect, since the World Wide Web was in fact one of several communication protocols on the internet, but in everyday parlance “the net” soon became a synonym for the web.

The rapid expansion of the web in the late 1990s was commercially driven, with numerous new forms of business. Internet portals with links to a range of different information were launched; they offered services such as email and sales (by mail order). In 1996, for example, Microsoft began to offer free email through its Hotmail service, which quickly gained millions of users all over the world. During what later became known as the IT bubble at the end of the 1990s, newly started so-called dotcom companies with a focus on the internet and the web increased enormously in a very short time. The actual business models were often less than stellar, but despite dubious prospects many companies were given staggering valuations. The bubble burst a year or so

after the turn of the millennium, and the new digital economy would continue to face significant issues with market valuations.

The increased activity on the web also meant that more and more information was being made available, making it harder for people to find what they were looking for. The solution came in the form of *search engines*, a semantic nod to the devices of the past that once processed information. Several of the search engines that initially led the way, such as AltaVista and Yahoo, started out by relying on a kind of semi-manual indexing of web pages, within different subject areas, where long lists of links were compiled. This worked quite well if there were not too many web pages to deal with, but it soon became clear that the web needed a whole new type of computerized information management system – similar to the one advocated by several of the early computer pioneers.

For Vannevar Bush and his Memex device, the idea to establish a rational information management system of a computerized nature arose from the similar challenge posed by the expanding collections held by archives and libraries. And in J.C.R. Licklider's book *Libraries of the Future* (1965) computers were posited as the saviour of the library sector (the book was dedicated to Bush). Licklider is a key figure in the history of the internet since he had funded ARPANET via the Defense Advanced Research Projects Agency. Back in the 1960s, Licklider had also written about how it should be possible to connect computers and people in a kind of "galactic network."

There are also practical connections between the library sector's mass of information and the growth of the web. A number of digital library projects were launched in the mid-1990s, one of which was the Stanford Digital Library Project, which aimed "to develop the enabling technologies for a single, integrated and 'universal' library." The project took on two doctoral students (Sergey Brin and Larry Page), who soon shifted their technological focus from old books to the exponentially growing information resources that the web offered. By 1996, there were over seventy-five million unique addresses on the web, and indexing this sprawling mass of information posed a major problem. The challenge was to build a system with the capacity to adapt to the explosive development of the web, and the genius of Google – the name of the company that Brin and Page now set up – lay in the realization that only an automated software system such as their PageRank system could keep up with the meteoric rise of the web. Google's page-ranking technology proved to be both fast and reliable, and thus became hugely popular. It was based on a series of (secret)



The white search box was already present in Google's first interface from 1998 – as well as the “I'm feeling lucky” button, which immediately took the user to the very first search result. At that time, about 10,000 search queries were answered every day. Nowadays, more than 50,000 requests are handled – per second. Internet Archive, Wayback Machine.

algorithms and included crawling the web to determine which pages were linking to other pages. Google regularly indexed all web pages, and by looking at previous searches the search engine self-improved. In 1998, Google indexed twenty-six million pages on the web; in 2000 they exceeded a billion pages. Just like with Babbage, computational science sat at the heart of the new communication technology, apparent in the origin of the company name if nothing else. In mathematics a *googol* is  $10^{100}$ , a one followed by one hundred zeroes.

## The Social Significance of Computerization



The contemporary development of digital media is often seen as incredibly fast, and Google is perhaps the leading example of a company that has managed to adapt to (and to some extent steer) this development. And yet, the computer has been quite a sluggish medium. It has been constantly refined, of course, often at an incredibly fast rate. Still, computers have been around since the 1940s. More than fifty years ago, mainframe computers were key calculating machines in many of the Western world's welfare societies. An overview of media history can therefore hardly avoid stating that computers and the networks they form together are perhaps the most complex forms of media and communication that humankind has ever constructed.

Computerization has become an accepted term for the far-reaching social process that began in the Western world in the postwar years, when computers started being used for tasks in an increasing number of areas – first within working life, public administration, and commerce, then increasingly within domestic life and various media and socio-cultural industries. The main social and economic driver behind computerization was the pursuit of efficiencies and automation, with process-based tasks such as payroll administration, stock-taking, and bookkeeping made easier, faster, and cheaper with the help of computers. Rationalization was usually the main argument, and computerization initially focused on changes to working life. As we have described, the media history of the office involved a host of efficiency measures, from the typewriters, forms, and telephones of the interwar years – with desks often arranged in uniform rows to form a “typing pool” – to the open plan offices (a term from the 1960s), in which computers (or rather the terminals that were connected to the mainframe) became commonplace. In addition, the computerization of working life was often gendered. Female computer users carried out terminal-based work at cash desks, in banks, and in offices – and later also secretarial tasks such as data entry and word processing – while men tended to be involved in computer use that required higher qualifications.

Even though it is a small country, Sweden is a case in point: eventually it became one of the most computerized countries in the world, with the Social Democratic welfare state generating a broadly positive attitude towards change, technical advances, and social engineering, and with rising levels of education in the general population. Furthermore, both state institutions and major corporations had high administrative ambitions, in which the computerization of laborious tasks provided an ideal solution. Sweden was also quick to develop its own national production of computers. Around 1960, the partially state-owned company Datasaab produced a transistor-based computer, the D2, as a kind of prototype and development platform for the systems of the Swedish Air Force. As happened in the US and other countries, computerization was initially driven by military interests, with computers used primarily as calculating machines. However, the same computers could also be put to use within administrative and automatic data processing systems, where the focus was typically on office tasks such as payroll management, bookkeeping, and invoicing. The pattern was similar in most western European countries: computers were developed for technical and administrative applications, from the population registers of county administrative boards to terminal



systems in the banking sector. Such systems continued to dominate until the middle of the 1980s, and for ordinary people this period of computerization was mostly linked to the bland reality of working life.

Just like the everyday media described earlier in the book, computerization is an illuminating example of a media use that gradually became so commonplace in the latter twentieth century – first within working life and then in more private contexts – that it was easy to forget their existence. User interfaces became increasingly powerful in the sense that computers represented reality in an apparently transparent way: a kind of immediate (unmediated) access to the thing being represented, what some media researchers have called *immediacy*. Consequently, computers and (later) networks became a fundamental infrastructure for the advancement of the information society that they almost turned into an invisible part of everyday life. Technology historian Langdon Winner has observed that we use telephones, cars, electric lighting, and computers in a conventional sense by switching them on – and switching them off. But such technological media soon become “forms of life in the most powerful sense: life would scarcely be thinkable without them ... They become woven into the texture of everyday life, the devices, techniques and systems that we adopt become a part of our very humanity.” In the latter part of the twentieth century, the computer joined the ranks of such powerful life forms as motoring, telephony, and electricity. As an overarching social process, computerization thus represented a kind of naturalization, to the extent that use of the technology was soon taken for granted. Over time, computers in their various forms became both indispensable and commonplace. Although they were always there, they often seemed like a kind of invisible medium within the routines of daily life.

In the public sphere, however, computers remained a tangible presence in prolonged debate about computerization’s polarizing effects in working life and society; the problems of computerization became a heated topic during the late 1960s and ’70s. It was also a sign of the times that the term *data policy* was used with increasing frequency. One area of discussion was the ways that computers reduced the number of working people; another was the data privacy implications of computerization, as more and more information about people was piled into ever-expanding databases. There was a great deal of hand wringing about the impact of computerization on employment, especially during the 1970s – echoing current discussions about how digitalization is said to be reducing the number of jobs available. An

editorial in a Swedish newspaper during the autumn of 1977, for example, declared that computers were taking over, and that Swedes were “rushing headlong into a data-driven society.” Some claimed that computerization caused unemployment and exclusion, while others highlighted a number of “obvious benefits” such as “being able to process large flows of information for very little cost in terms of time and effort, enabling public administration to become more efficient.” According to the editorial, however, the true disadvantages of computers lay elsewhere, namely in the fact that through computerization, human labour was gradually being transformed into a kind of dehumanized function of overseeing computer-controlled processes both in offices and on the factory floor. Opinions were certainly divided. Several studies showed that in the labour market as a whole, the advent of computers often led to as many new jobs being created as were being lost to efficiencies. Subsequent economic and historical research has also argued that, since computer use was bound up in a whole range of rationalization measures in working life, the question of whether computers made things better or worse was almost impossible to answer.

While the perceived threat from computers in North America and western Europe was (possibly) not as substantial in the labour market as many feared, the impact of computer technology on personal privacy was considered much graver. Most people agreed that surveillance was one of the more sinister sides of society’s computerization. Different data protection authorities were hence put to work in a number of countries: the Swedish Data Protection Authority, *Datainspektionen*, began its work in 1973, the Austrian *Datenschutzbehörde* in 1978, and the Norwegian *Datatilsynet* in 1980. Such authorities were given responsibility for the way personal data was processed as a way to ensure rudimentary privacy protections in conjunction with the storage of personal data. Nevertheless, legislation related to Western society’s computerization became increasingly complex, not least since personal data was often collected in different databases, from social security to taxation and health care. When these databases were combined with each other, it suddenly became possible to conduct in-depth monitoring and checks on individuals, which could easily escalate into violations of personal privacy.

As personal computers became more widespread during the 1980s, consideration of the technology’s impact moved from work and law towards private life and the more general socio-cultural consequences of computerization. In 1989, it was estimated that around 15 per cent

of American households owned a personal computer, a figure that doubled to almost 30 per cent if families had children. Domestic computerization, however, proved difficult to diagnose. Even if a Swedish report from the Commission on the Effects of Computerization on Employment primarily focused on computers and work, its final report from 1984 dwelt on what computerization actually meant for lifestyle, media, and culture: “Technical advances are [now] creating information technology that can be used in various leisure activities. This information technology differs from television in that it offers opportunities for two-way communication. Computer technology is [therefore] likely to influence people’s way of thinking ... such that our whole way of life may change. The effect of such changes cannot be observed in the short term but will only become apparent in hindsight ... Will greater computerization of society’s relation to its citizens weaken the shared values or will the wider availability of information encourage greater social interactions?”

The report made it obvious that a successive convergence between computers and other media technologies was already noticeable in the mid-1980s. The effects of computerization on the media and cultural industries (and on private consumption) replaced – or rather supplemented – previous discussions about the social significance of computerization. In short, computers came to be reprogrammed from numerical machines that processed data to a kind of creative tool for representing data, a process that during the early 1990s evolved into a perception of the computer as a kind of communicative culture machine.

## Mobile Devices – Social and Streaming Media



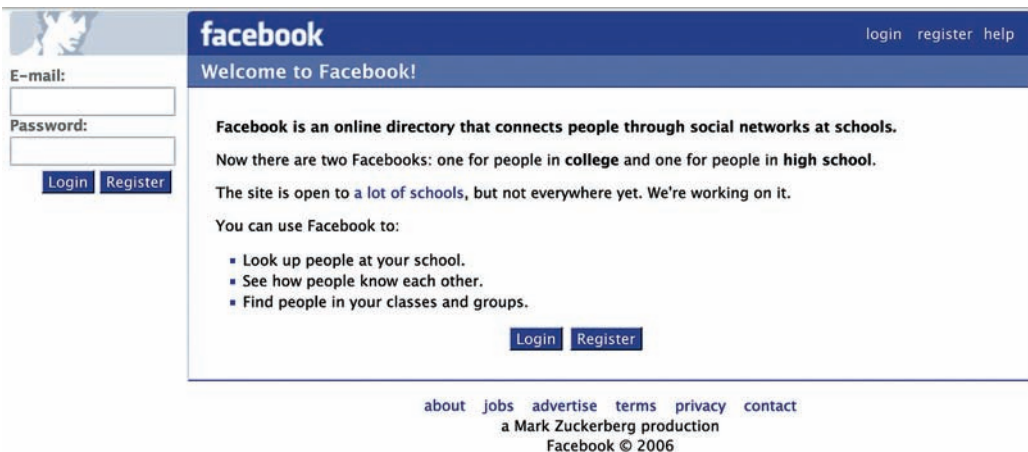
From the mid-1990s onwards, the two main threads that we have examined – the computer and the network – merged into a single entity. Google was the first internet-based company to really understand and appreciate the convergence of computers and networks, and the company quickly became the dominant force in the digital era. In addition, Google soon broadened its repertoire from being just a search engine to providing all sorts of digital information-based services: Gmail was launched in 2004, Google Books and the Library Project began that same year, and the searchable Google Maps service was presented in 2005, while the video site YouTube was purchased in 2006, the same year that the word processing program Google Docs was released.

And all these services were free. They were rooted in the notion that networks and computers were the same thing, and because the net was global, Google was able to generate an enormous user base from which it could earn money through targeted advertising.

The web-based business concept of first offering a free service, and then considering how to make money from it, set the general template for the development of the online economy during the 2000s. The symbiosis between computer and internet remained intact, but advances largely took things in a mobile direction, with the integration of hardware, software, and the internet as a key success factor. In many ways, progress in the new millennium was about the emergence of a brand-new type of digital infrastructure, which the so-called new media – now with updated monikers such as streaming media and social media – came to dominate. This development can be summed up in two key phrases: mobile hardware and user-generated content.

A significant change in the first decades of the new millennium was the commercial rivalry that arose between PCs and new forms of mobile IT products. A number of companies produced increasingly sophisticated hardware in which the functions of the personal computer were packed into ever smaller mobile devices. The computer and the mobile phone entered a new alliance, and the attraction of these devices lay in the fact that they were constantly connected to an internet packed with content and services, what would come to be called *cloud computing*.

In 2006 not many people believed that Facebook would become popular. Internet Archive, Wayback Machine.



Apple's iPhone stands out as the most important IT product in recent years. Between 2007 and 2017, Apple sold one billion iPhones, making it the most valued company ever. Wikimedia Commons.



In 2011, not long before he passed away, Steve Jobs expressed the view that the personal computers Apple and others had been building since the late 1970s faced the same fate as trucks. Trucks were needed in an agrarian nation, explained Jobs, but as people moved to urban centres, cars became more popular. Similarly, he predicted, PCs are going to be workhorses like trucks, while tablets, smartphones, and variants of these devices will be used for consumption of information online. From Jobs's perspective, the launch of the iPhone in 2007 was the catalyst for this change. Looking back, the commercial success of the iPhone can be seen as a global techno-cultural phenomenon. The iPhone was a media device that blurred the boundaries between work and leisure, with all media forms converged within it plus masses



of software applications – what we now call apps. Apple was not the first to produce a smartphone, just as the company's iPod was not the first music player for MP3 files. But through cutting-edge technology and design, a peerless user interface, and extravagant marketing, Apple set a whole new standard. Information design had always been important to Apple, especially regarding the development of new interfaces, but with the iPhone, IT came to be just as much about fashion – or as one commentator put it at the launch of the iPhone: “Apple deals in haute couture, not in high tech.”

Mobile hardware, entirely dependent on an ever-expanding mobile broadband network through 3G technology, was one of two significant changes in this period, the other being the rise of user-generated content – from the video portal YouTube to social media services such as Facebook (launched in 2006). The idea of linking information together was important right from the start when Berners-Lee invented the World Wide Web, and after the turn of the millennium it was the sharing of information via the web that fuelled the digital revolution. From file sharing to personal blogs (a kind of personal log or diary) and the so-called Web 2.0, an enormous amount of user-generated content was created by the web's many millions of users.

File sharing – which prompted heated debates and was both loved and hated – stands as a key phenomenon for understanding how the media landscape changed in the years after 2000 (although it did not take place over the web, but via other types of communication protocols on the internet). In 1999, Napster was the first file-sharing program used by large numbers of people, and its power lay in that extensive network of users (at one time Napster had more than 30 million regular users). The speed of file sharing or *peer-to-peer* (P2P) networks increased, and soon a large proportion of *all* internet traffic was made up of various kinds of media files (often copyrighted Hollywood films) that were uploaded and downloaded across various P2P systems. In technical terms, the remarkable thing about BitTorrent, a particularly popular internet transfer protocol, was that where the online distribution of audiovisual media via a website slowed down when there were too many users, the opposite was true with BitTorrent. The more users there were, the faster the distribution, because as soon as you downloaded a data file, which was divided into smaller pieces, you also became an uploader of the parts of the file that you had just received. The same personal computer could thus function as both the client (recipient of parts of the file) and server (supplier of parts of the file).

The most famous logo for file sharing was Sweden's The Pirate Bay – including the ironic reference to the British anti-pirate copying campaign from the 1980s: “Home Taping Is Killing Music” (the cassette tape with crossed bones). Wikimedia Commons.



During the early 2000s, The Pirate Bay became one of the world's most widely used websites for file sharing. Originally based in Sweden, the site became known because its administrators maintained a brazen public profile, defending what they saw as the right to exchange information freely; the dispute was essentially about the same thing as Bill Gates's open letter from 1975. There is also a connection to the early history of printing, when similar piracy was associated with a new medium (the printed book). As we have described, pirate printing was the rule rather than the exception at the time, and it was often seen as positive since it meant that the content of books was spread more widely.

The idea of sharing information – as well as notions of asserting rights to its free exchange and use – thus stretches a long way back in time, although most media pirates then (as now) preferred to remain anonymous. Since it was technically impossible to show exactly who file shared what, since sharing was distributed between a potentially infinite number of users, The Pirate Bay underlined an important principle for the new internet society and its service providers: namely that such players should not be held accountable for what users did on the internet. The common analogy was to the postal service delivering a package: they don't open it to check the contents.

Beginning in the early 2000s, what was referred to as the Web 2.0 led to the launch of a raft of global (and often semi-commercial) services. The term Web 2.0 was coined after the turn of the millennium as a way of describing web content created by users on web platforms specifically designed for this purpose. A feature shared by most of them was that they were free, and just like with Google (the leading business model), the owners hoped to earn money through advertising once enough users had signed up. Launched in 2003, the social networking service Myspace was one of the first Web 2.0 services, and it quickly became immensely popular, not least due to its focus on music. Many unknown artists started their careers thanks to their profile pages on Myspace but, as with other Web 2.0 sites, the popularity of Myspace dwindled after just a couple of years. What most of the Web 2.0 services – from Wikipedia to telecom services such as Skype and social media sites such as Facebook, Twitter, and Instagram – had in common, however, was that they were all based on collaboration and communication, and on users sharing information with each other.

The history of YouTube is particularly illustrative of how a new type of digital infrastructure was established online during the 2000s. YouTube was set up in 2005 with venture capital by a small technology company that happened to launch a user-driven video service at precisely the right moment in time, when broadband (in the form of a cable-based, high-speed connection to the internet) had become common and the video format Flash had revolutionized video playback (it previously took a selection of programs to play the range of stubbornly unstandardized video formats). YouTube quickly outcompeted its rivals with its capacity to both attract users and share popular video content. The site was marketed as a collaborative creation, a more or less neutral platform – a term that would become common from this point on – that everyone could use. “Broadcast Yourself” was the site’s motto, and YouTube targeted amateurs, advertisers, and professional producers on more or less the same terms. The advent of YouTube also birthed the term streaming media, and by establishing a dynamic and interactive short-form culture, the site soon became one of the world’s most popular media archives. The special thing about YouTube, however, was the way the platform navigated a path between being an online community and a commercial site. Google bought the video site for US\$1.65 billion in 2006, and at the time it was one of the most talked-about internet acquisitions ever, spurring on many a start-up.

## Digital Media Specificity and Big Data



The story of the rise of the computer as a media form, and how in the guise of the personal computer it was linked into networks, is in many ways about the establishment of a whole new form of media and communication. Through the internet, the computer (and its mobile clones) developed from a calculating device to an interconnected multimediuim – a pattern similar to other media developments that we have described in this book. The rise of the computer, however, was meteoric. Even during the debates about computerization in the 1980s few people predicted what an enormous role computers, the internet, and digital media would play just a few decades later.

Rather than trying to tease out the details of recent digital history – which is harder, the closer you come to the present – we would finally like to point out the ways in which new computer-based media have come to differ from twentieth-century mass media. Highlighting and examining some of the differences allows us to discern at least a few specific characteristics. We will also link back to previous discussions about how most media forms exist in parallel, while at the same time being different from each other.

One basic problem when comparing mass media with digital media is that both media forms have continued to develop; another is that in many ways they have converged. For example, the trajectory of digital media has meant that the streaming media forms of ten or fifteen years ago are completely different from today's: the audio and image quality is much better; the technology is more robust; social interaction is greater; images and sound can now be stopped, rewind, and repeated; customization and selection are done by algorithms, and so on. Mass media and digital media are also difficult to separate because they now literally overlap. Twitter, a service that started as a microblog in 2006, is a specific digital media form, but it is also an enormous mass medium. As is well known, US president Donald Trump had more than 60 million followers on Twitter (before his account was suspended in January 2021).

Another difference between these media forms can be drawn from classic mass media theory. Traditional mass media of the twentieth century were often *push*-driven: they pushed out and distributed content to citizens through various media channels, although it has of course always been possible to switch off the radio or put down a newspaper. Today's digital information landscape is much more *pull*-driven and automated through different kinds of algorithms, often



## Convergence Culture | HENRY JENKINS

Are posts by a video blogger ads or entertainment? Is a blogger a professional media producer or a private individual who edits videos in their spare time? The difficulty in telling the difference is a defining feature of communication in the media society of the twenty-first century. The boundaries between private and public have become blurred, just like those between news, entertainment, and marketing, between mass communication and two-way communication, between media companies and soft-drink manufacturers, between producers and consumers. And our media devices follow the same trend, being production tools, storage devices, and platforms for consumption all at the same time.

Henry Jenkins was not the first to make such an observation, but his examination of media's blurred boundaries in *Convergence Culture* (2006) has been instructive to many (and angered others). Convergence refers to things coming together, the opposite of divergence. Jenkins stresses that the perpetual process is the important thing, as there is no predetermined goal. Then again, it is the cultural consequences of this technological shift that interest him.

When text, images, and sound could be combined and distributed via the same channels, it created a financial incentive for media companies to find synergies between different formats, platforms, and content. The same company might publish books and newspapers, and produce television programs, films, and music. In some cases, trans-media narratives are created, fictitious worlds that expand within several media forms at the same time: in videogames, TV series, comic books, and movies. The

audience is encouraged to follow the story from one medium to the next.

Companies and other actors that have previously been outside the traditional media sector are becoming increasingly involved in the production and sharing of media content. Some market themselves through specially commissioned TV series and games, while others work with media productions to write their own brand into the narrative. As the battle for attention intensifies, it is important to convert the brand into a *lovemark*, something that gets consumers to engage and remain loyal.

In digital contexts, (media) companies are confronted with consumers acting as producers. Some of them will only leave a comment, while others record their own story or remix what is uploaded by the major players. Jenkins sees democratic potential in such grassroots participation. The thresholds for participation and getting your voice heard are reduced when every computer and phone is also a production unit. Still, much of the user participation has remained strong in pop cultural domains.

When Jenkins published his book, some aspects of the analysis and examples he gave seemed extreme. He gave a detailed account of fans spending day and night on web forums trying to figure out who would win a reality show; he analyzed the intricate narrative structure of *The Matrix*; he wrote about tweens publishing fan fiction about their favourite characters. But what seemed extreme in 2006 has since become an everyday phenomenon. The media culture has changed quickly, and Jenkins's analysis pinpointed emerging features as well as residual elements.



based on users making their own selections. We could continue to list examples comparing mass media with digital media, but instead will focus on three overarching thematic differences that are of particular interest – sharing, dynamics, and personalization – which also goes to show how media forms now operate in symbiosis.

The sharing of information over networks is a core feature of many digital media. From file sharing to the user-driven Web 2.0, at play is the same sharing logic that would later also define popular social media like Facebook, Instagram, and TikTok. What such internet platforms primarily do is provide a service for users where media content can be uploaded (by other users) and shared. With the advent of Web 2.0, anyone could publish anything, which in the 2000s meant that the user-generated web was often depicted as a kind of amateurs' playground. *The Cult of the Amateur: How Today's Internet Is Killing Our Culture* by Andrew Keen was a typical book title from the time. The sharing of (amateur) content that users themselves had created led the traditional mass media to identify and promote themselves as guarantors of better-quality content, since items published in a newspaper were subject to editorial scrutiny. In this context, the mass media – which some now referred to snippily as old media – saw themselves as gatekeepers for more professional and qualitatively superior content than what was circulating online in the digital media landscape.

Just a couple of years into the 2010s, however, this difference between traditional mass media and digital media was no longer quite as marked, partly because more and more forums and sites had been established online offering higher-quality content, and partly because the traditional mass media had carved out a presence on practically all social media services. Mass media such as newspapers and public service broadcasters now coexisted with most digital media platforms, where clickbait and constant monitoring of user behaviour came to influence the way they operated. Although mass media had long been digital in terms of production and distribution, a presence on social media became increasingly important, a fact that did not stop some from criticizing these new media. For example, while European public service broadcasters claimed they were marketing their own programs through their social media channels, others felt that they were supplying US internet behemoths with licence fee-funded content.

Another important difference between mass media and digital media is more technical in nature; all digital media are code-based. They are copyable; file sharing and The Pirate Bay were technically

impossible before digital media came along. Whereas a printed newspaper (or book) could not be changed, the fluid dynamics of the digital media became increasingly apparent during the second half of the 2000s. All media could now be quickly updated, edited, and indeed deleted. During this period, the term *news flow* became more than a metaphor, because digital media had constant and almost endless streams not just of audio and moving images but also textual updates. On Twitter the length of texts was strictly limited – but the availability of content was infinite. It is true that multiple daily editions or different geographical editions of twentieth-century newspapers might sometimes be printed, but compared with web-based press content, they could never compete. By the early 2010s, such news reporting had developed into a media product that was constantly changing. Just like in the mass media era, daily newspapers continued to be distributed through letter boxes every morning, although subscriptions fell, along with ad revenues, which now went to Google and Facebook. But for most media enterprises, the printed newspaper was only one post-digital end product of many. News content also included updates, varying versions of articles, social media posts, podcasts, or video formats.

Mass media such as daily newspapers – in a whole host of dynamically shifting formats – illustrate how difficult it has become to separate different media forms. The unstable dynamics of the digital media had both pros and cons. One of the disadvantages usually identified was that because they are made up of code, they could (far too) easily be amended and thus also misrepresented; *fake news* consequently became increasingly common in the news flow of the 2010s. One of media theorist Lev Manovich's characteristics of digital media (formulated back at the start of the millennium) was specifically their capacity to be manipulated. This ability to be edited and manipulated was important in the transition from analog to digital, but the differences should not be exaggerated. Adobe's launch of the photo editing software Photoshop in 1990, for example, did not give birth to photographic manipulation; it was always possible, even common practice, to change and adjust a photographic image in the darkroom. And while identity documents and passports came with (analog) photographs in the twentieth century, the same goes for today's usage of digital image formats. The fact that digital images can be manipulated has not (yet) destroyed their credibility as powerful graphical indexes.

Comparing the stability of traditional mass media with the dynamism of digital media does throw up certain issues to be wary of. At the same time, change and fluidity are a natural part of how digital media

work. As these media became the default for more and more people during the 2010s, attention was also drawn to the ways that their form affected the content – for example, how web browsers changed how content was presented. Users simply became accustomed to the fact that a website looked slightly different in Google Chrome, Firefox, or Safari, something that could also vary depending on personal settings. Such changes tended not to be major, but they could be significant – if a person used software that blocked advertising, for example. The point to be made is that, in contrast to printed or broadcast mass media content, the same digital content did not reach all users the same way. The composition of different elements on a web page became adapted to the particular web browser and the geographical location of the user. Restricted rights to content were also sometimes nationally regulated. Via internet protocol (IP) address – the long number used as an address on the internet – national users were sometimes limited in their access to online content from other countries.

Digital media use was thus always individual, and one can argue that personalization constituted perhaps the most important difference between mass media and digital media. One of the most remarkable aspects of today's digital media landscape is that media consumption and the way the media are used have fundamentally changed in a short time, and hence become different from many of the mass media we have written about before. Various forms of interactivity with readers, viewers, and listeners signify a break with how mass media previously presented their content, and social media use in particular developed into something highly individualistic. People were as unlikely to read Facebook and Twitter as a group activity as they were to look at Instagram together. But they were still media that attracted the masses – during 2022, Facebook reached almost three billion users – without being traditional mass media.

Mass communication's one-to-all distribution model was therefore supplemented and, to some extent, replaced by few-to-few media. This also gave rise to so-called filter bubbles, where individual users on social media only read, listened to, and watched content with which they politically and ideologically sympathized, because they could personally choose exactly which flows they wanted to follow. Contemporary media research has, however, suggested that filter bubbles are probably not as common as journalists (and some politicians) have claimed. Even social media consumption is heterogeneous. Advocates of the theory of filter bubbles have also often made an error in assuming that citizens of past societies were more enlightened and less

susceptible to external influences than was ever the case. Conversely, the distinctly partisan press of the twentieth century was also a kind of filter bubble because it portrayed the world (at least in editorials) through the lens of certain ideological perspectives.

The picture is therefore not clear-cut; reading a newspaper, for example, is as individual as it ever was. On one hand, one can argue that in slightly less than a decade individual media consumption has come to challenge the traditional media use of the twentieth century and its collective nature, in the form of cinemas or shared listening in front of the radio or TV at home. On the other hand, people now watch much more video content than before via individualized media channels. A kind of collective community is still discernible on a gigantic platform such as Facebook, both in small Facebook groups, and on a major scale with news flows that reach a billion readers simultaneously. Similarly, one can point out that the Eurovision Song Contest or Super Bowl continue to gather many millions of people around their TVs, and that linear TV viewing remains strong. Some television series on Netflix or HBO still create a collective impact and water-cooler moments. However, the general audience trend is moving in the opposite direction. Digital media have had an explosive effect, fragmenting mass audiences and expanding the availability of content. Huge numbers of television series are now available for viewers to watch – and not all of them are new productions. Older content is also proving attractive. The time horizon of the streaming media is therefore different; platforms such as Netflix, YouTube, and Spotify function as constantly swelling archives, with media history as a constant presence through older content. Program listings still exist, but they belong more and more to the past, and mobile media consumption has broadened accessibility. Reading, listening to, and watching what you want, when you want, and where you want has become a new global standard.

The personalized content of digital media is also apparent (and much debated) when it comes to search results on the web, since they are generally based on earlier search history. Most commercial sites work on search engine optimization, a collection of methods and techniques for making a website appear as high up as possible on the results of searches. At the same time, Google stores every single previous search and all online history for sites visited – which some see as an invasion of privacy – with the purpose of better adapting results to individual preferences and needs. So, in contrast to mass media, digital media are personalized in various ways. In addition, most websites store cookies in the user's web browser, small data files that keep

track of a visitor's preferences and identity (data that is saved on web servers). Cookies are used, for example, by news sites (with so-called soft paywalls) to keep account of how many articles have been clicked on. However, it doesn't take much to delete your cookies and gain access to all articles again. Anyone who knows their way around a web browser can also easily block certain websites from placing cookies on their computer.

What the personalization of the media offering shows above all is how the data surrounding media consumption is not just about providing personal choice, but about how those personal choices are recorded (as data stored and processed by media services and online platforms). On social media, we choose what content will be streamed via these digital platforms, and once we have made a number of such choices, the recommendation algorithms kick in and tailor offerings to us. And it is almost impossible to avoid; everyone who uses Apple Music or Spotify is sooner or later going to encounter algorithmic music recommendations in the form of data-driven tips on new music.

The death of privacy? Spotify advertisement in the London underground, 2016. Private photograph.





As the digital has become increasingly the default, the recommendations economy – which gets us to buy, watch, or listen to choices based on our own and other people’s behaviour patterns – has been refined and sophisticated in the hands of modern IT companies such as Spotify, Amazon, Netflix, and TikTok. For the former, music is very much a data-driven business, with a focus not just on the music being listened to but on the data that such listening creates. When Spotify launched a new ad campaign in autumn 2016, for example, they drew on the enormous reservoir of information – *big data* – that the company had collected on listening habits. “To all 107,112 people who listened to ‘Cold Water’ on the hottest day of the year. We like the way you think. – Spotify.” In one way, this was an unusually inventive ad campaign that used a touch of humour to de-dramatize the fact that Spotify knew everything about its listeners. In another way, it is a sad reminder of the death of privacy.

Personalization and algorithmic recommendations are, however, based on storage of big data that often mimic different biases that are prevalent in society. Feminist scholars have consequently argued that algorithmic culture in general and Google’s search engine in particular are not neutral but often express gendered prejudices. The auto suggestion feature of Google has sometimes even been disheartening, displaying suggestions that bear a striking resemblance to earlier racial or colonial stereotypes in media. In her book *Algorithms of Oppression: How Search Engines Reinforce Racism* (2018), internet scholar Safiya Umoja Noble has firmly asserted that data discrimination is a real social problem. The monopoly status of Google search has led to a biased set of search algorithms that privilege whiteness and discriminate against people of colour, specifically women of colour. Hence, her book seeks to highlight cases of “algorithmically driven data failures that are specific to people of colour and women and to underscore the structural ways that racism and sexism are fundamental” to what she calls “algorithmic oppression.” Within the field of artificial intelligence (AI) similar worries have been raised. In 2019, IBM tried to respond to concerns about bias in its AI systems by creating a more inclusive dataset called Diversity in Faces, since several previous facial recognition systems had far greater error rates for people with darker skin, particularly women. As Kate Crawford states in her book *Atlas of AI* (2021), the goal of IBM was to increase diversity of facial recognition data, by training new, large AI models. Naturally, these consume a lot of computer processing power and hence electricity. Energy consumption and carbon footprint have been exploding during the last

years as AI models are fed more and more data, an environmental consequences of digital media usage that has often been disregarded.

The term *big data* usually refers to different types of digitally stored information on a scale of tera or petabytes. Big data is used in many areas – from health care to climate analysis – but in a media context it is often associated with companies such as Google or Facebook, which process enormous flows of data in real time. Streaming media platforms like Spotify or Netflix are also flooded with gigantic quantities of data. These services use specific methods of collection and storage, sharing and analysis of big data to deliver better recommendations and content that listeners or viewers enjoy. The data that Spotify constantly gathers from its users, for instance, was once about giving tips on new music that, on a purely statistical basis, should cater to the taste of the analyzed listener segment. However, the same data are now used to conduct both a detailed inventory, investigation, and analysis of listening patterns, and perform almost scientific analyses of listening with the help of sophisticated algorithms. At Netflix, big data has been used to customize production formats to suit their audience. In streaming form, a TV series always watches the person watching; data flows in both directions. Netflix not only knows exactly what its more than 200 million paying subscribers like to watch – with the medium literally picking out content for the viewer – the company also knows how the streamed content is being consumed and what types of stories and actors are most popular. Measuring media habits using big data has become a way to produce content that matches the information gathered.



## AFTERWORD

During the last few decades computers and digital networks have blurred the line between text, images, and sound, between mass communication and two-way communication, and between creator and user. The common feature of content is now code. Screens and user interfaces maintain a graphical illusion that media forms are different, but at the *back end* of media technology differences have been erased. Most web browsers have a tab for developers and clicking on it brings up a seemingly endless stream of code that governs and controls the content. Friedrich Kittler's media theory from the 1980s encapsulates this phenomenon: "Once movies and music, phone calls and texts reach households via optical fiber cables, the formerly distinct media of television, radio, telephone and mail converge, standardized by transmission frequencies and bit format." Media history would appear to have reached its end – everything has become the same, a collection of digits.

But while linear code pulls media together, from a macro perspective, one can instead see the past 200 years of media history as circular. Take visual media as an example. In the early nineteenth century, itinerant showmen travelled the countryside presenting their magic lantern images to a few people in villages and small towns. Fifty years later, illustrated magazines were printed in the hundreds of thousands – an impressive increase in potential readers and audiences. Yet this figure pales in comparison to the fifty million people who saw D.W. Griffiths's feature film *The Birth of a Nation* in the five years after its premiere in 1915. When television conquered the Western world in the mid-twentieth century, these audience figures multiplied again, this time almost exponentially. Over half a billion television viewers are said to have watched the American astronauts land on the moon in 1969.

The mass media that attracted such enormous mass audiences were powerful, making it important to understand them. The media research that emerged in the wake of the propaganda initiatives from both world wars and the frontlines of the Cold War focused, with few exceptions, on mass media. Questions ranged from the impact and effect these media had, to how they duped the masses or were

manipulated by powerful ideological or economic interests. From a research perspective mass media were, in short, problematic. Today, media research faces new problems, and it is becoming increasingly difficult to justify studies of traditional mass audiences. In addition, data on media consumption are often proprietary and not available for academic research. In a time of individualized and digital media consumption, the audiences for mass media have also shrunk, although certain live television broadcasts, such as the FIFA World Cup, can still attract hundreds of millions of viewers. On some platforms a few mega celebrities have millions of followers. During spring 2021, for example, football superstar Cristiano Ronaldo was the first person to reach 500 million followers on Instagram, Facebook, and Twitter.

Social media's refined recommendation algorithms, *micro targeting*, and the ability to individually tailor whom to follow has led to a situation where traditional mass media have partially lost their power to attract audiences, not to mention their status as political arenas and the go-to source for research. They are far from extinct, but they are no longer the key players around which everything else revolves. Today's showmen and women have surrendered the magic lantern for new media technologies, but the audiences that see the images (on Instagram, for example) are not necessarily any larger than those captivated by projected images in the nineteenth century. There are also other similarities. The interaction between the charismatic magic lantern operator and the attending audience was an important part of the performance's attraction, and today's digital communication is often dependent on the same type of recurring interaction.

Media history tends not to feature clean breaks. In fact, it has usually been more a case of interactions between new media and old, with constant overlaps and repetitions. While many in today's media industry have faced the fact that the mass audiences of the twentieth century were a historical anomaly, particularly as advertising revenue dries up, the rise of influencers and YouTubers – who are playing an increasingly prominent role in younger people's lives – has created new forms of media influence. Studying this is an important task for today's media researchers, using updated digital methods of measurement, of course.

This book presents a very long history of the media. With its structure of forty-four sections, it differs from the standard overview of media history. We have focused on a number of features of media cultures, while at the same time attempting to highlight diversity and how different media have interacted. Instead of outlining breaks



and revolutions in media history, we have tried to illustrate continuities concerning how media have become established, used, and modified up until the present. The contemporary relationship between traditional mass media and social media is one example of the complex web of interwoven communication forms that make up this history. Different media forms have existed in parallel. Innovations and new ideas have interacted with inertia and repetition. A hockey stick graph, charting a sharp upswing in book publishing numbers, shows that never before have so many book titles been published as today. The rising popularity of podcasts also suggests that radio should not be considered a dinosaur. And as we stated in our introduction, oral storytelling flourished in Belgrade just two decades ago.

Today, many people feel that the media increasingly permeate more and more sectors of everyday life and society. This feeling is understandable. But it is important to remember that we share this experience with people who lived through earlier periods of history. We must go a very long way back to find a time when the media were not making their mark on life and society. One explanation for this forgetfulness – which makes it possible to single out one’s own time as unique – is that old and established media stop being perceived as media. Lisa Gitelman goes so far as to say that one criterion for a medium’s success is that we become blind to it as a medium. “The success of all media depends at some level on inattention or ‘blindness’ to the media technologies themselves (and all of their supporting protocols) in favour of attention to the phenomena, ‘the content,’ that they represent for users’ edification or enjoyment.”

While it is hard to ignore the onset of today’s latest technologies, it is easier to forget media that have been part of everyday life for a long time. As a media form, bookkeeping has counted and recorded people, workers, and assets for thousands of years. The media of the world’s religions have determined people’s relationships with life and death, and a life beyond. Legal texts, contracts, and administrative documents have long defined what is right and wrong, mine and yours – even what actually *is*, what exists. Most people have experienced the consequences of the bureaucratic principle that what is not in the documents does not exist. Cases cannot be processed until the form has been correctly filled in. For people without papers or the right documents, their whole existence is threatened. The fact that forms are a given part of everyday life means that they are often not considered to be a medium. By exploring the media infrastructures of the past, we can thus bring forgotten but still present media out of the

shadows, while at the same time trying to situate what we consider unique about our own age in a historical context.

But what is the point of such observations? What is media history for? A simple answer is that it gives us a better understanding of our present; as Gitelman suggests, we are able to see what we have become blind to. It is, however, a two-way street. Our present situation also opens up new ways of looking at and understanding the past. Today's so-called social media have led historians to ask new questions about the social functions of media in earlier societies; talk about everything being digital has yielded new perspectives on book printing, the punch-card programmed weaving loom, and telegraphy; the media convergence of our age has called into question what were previously seen as watertight divisions between history's media forms – boundaries once taken for granted have thus been erased.

Obviously, any writing about history is conditioned by the time in which it was written. It is, however, just as important to recognize that understanding the relationship between the past and the present is a never-ending process in the production of historical knowledge. This is what differentiates historical knowledge from the pursuit of knowledge in other forms. On one hand, researchers and students with a contemporary focus, and indeed interested members of the public, need knowledge about the past and insight into what it means to apply a historical perspective to phenomena and processes, instead of seeing history as a static and unchanging “backdrop.” Otherwise, our understanding of the present becomes flat and empty; spotting directions and trends in what happens now becomes literally impossible, as does the realization that the course of events is historically conditioned and not set in stone. On the other hand, it means that historical insights become relevant only in relation to the present. Only when we take the pendulum movement between now and then seriously can we say what truly sets our time and ourselves apart.

A common idea about the benefit of historical perspectives is that, through them, we can understand how we have ended up where we are. And that is of course true. But the value of history is much more far-reaching. History makes it possible for us to identify the parameters for and limitations in our present situation, regardless of the roads that led us here. Everything takes on meaning in relation to something else, but there is no formula to determine which comparisons will generate the most rewarding revelations and get us to see our own time more clearly. As Sybille Krämer has stated (referred in one of the theorist text boxes), it may be the overlooked messenger

that reveals what media are and do, including in our present time. Or it might be the Excel sheets in clay that took shape 10,000 years ago – they indicate that cultures are held together as much by bookkeeping and records as they are by stories and myths.

By this point, it should also be clear that media history cannot be seen only, or even primarily, as a specialist subject or subdivision within a more general, more important history. A media history perspective can be applied to any historical phenomenon. This is not just because the past is only available to us in mediated form – whether through ancient graffiti, runestones, archival documents, hand-coloured lithographs, decaying newspapers, or last year’s YouTube clips – and no mediation is ever a neutral reflection of what is being mediated. In this sense, media history perspectives are an update of the traditional arsenal deployed in source criticism. It is also because – as the long timespan of this book suggests – media in various forms have featured in and influenced human societies since those societies first came into being. Every society was a media society – in its own way. We therefore hope that we have introduced readers to some specific views, a selection of currently more or less established interpretations of certain key processes, and a solid amount of pure factual information. We also hope you will include a media history perspective in your way of thinking and looking at the world.



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Traffic in Souls (1913),” *White Angel* 19, no. 4 (1997), and by Solveig Jülich in her *Skuggor av sanning: Tidig svensk radiologi och visuell kultur* (Linköping: Linköping University, 2002).

### *Speech in the Public Sphere*

A couple of introductions to the field are Carolyn Eastman, “Oratory and Platform Culture in Britain and North America, 1740–1900,” *Oxford Online Handbooks*, and Tom F. Wright, *Lecturing the Atlantic: Speech, Print, and an Anglo-American Commons 1830–1870* (New York: Oxford University Press, 2017). A good introduction to the oral publicity of the period on which our presentation rests is given in Jakob Kihlberg’s *Gränslösa anspråk: Offentliga möten och skapandet av det internationella, 1840–1860* (Lund: Media History, Lund University, 2018), which also makes a more specific contribution to the history of international meetings. On reform meetings in England and Ireland, see Maura Cronin, “‘Of One Mind’? O’Connellite Crowds in the 1830s and 1840s,” in *Crowds in Ireland, c. 1720–1920* (London: Palgrave Macmillan, 2000), edited by Peter Jupp and Eoin Magennis. The quotations regarding the temperance meeting in Hällestad and about Peter Wieselgren can be found in Patrik Lundell’s “Nykterhetsfrågans mediala förutsättningar och karaktär,” in *1800-talets mediasystem*, edited by Jonas Harvard and Patrik Lundell (Stockholm: The National Library, 2010), 93–4. In the same anthology and as an example of campaign work, the campaigns that preceded the Swedish representation reform are analyzed in two texts: Jonas Harvard’s “Medial mobilisering: Opinionsstormen och representationsreformen” and Madeleine Hurd’s “Tidningsgenrer och offentliga ritualer i 1865 års reformrörelse.” The parasitic relationship of newspapers to oral culture is discussed in Martin Hewitt, “Aspects of Platform Culture in Nineteenth-Century Britain,” *Nineteenth-Century Prose* 29, no. 1 (2002).

### *The Medium Par Excellence?*

Quote on pressophilia in Swedish newspaper *Aftonbladet* on 5 March 1894. The self-legitimation of the press is dealt with by Mark Hampton in his *Visions of the Press in Britain, 1850–1950* (Urbana: University of Illinois Press, 2004), and for the Swedish part by Patrik Lundell in *Attentatet mot Hiertas minne: Studier i den svenska pressens mediehistoria* (Stockholm: National Library, 2013). The quote in Latin: Otto Sylwans, *Sveriges periodiska litteratur under frihetstidens första del (till mitten af 1750-talet)* (Lund, 1892), 86. The literature on nineteenth-century statues and other monuments is extensive; the Engelbrekt statue in Örebro is analyzed in Magnus Rodell’s *Att gjuta en nation: Statyinvigningar och nationsformering i Sverige vid 1800-talets mitt* (Stockholm: Natur & Kultur, 2002); there is much to read on the statue of Bruno, including Paula Findlen’s “A Hungry Mind: Giordano Bruno, Philosopher and Heretic,” *The Nation*, 10 September 2009.



### *The Modern Press*

The literature on the nineteenth-century press is large, and most of the information we have provided is easy to find in overviews and introductions. The newspapers as rubbish, the abundance of information, and the clip agencies follow Johan Jarlbrink's *Informations- och avfallshantering i papperstidningens tidevarv* (Lund: Media History, Lund University, 2018). The professionalization process and ideas about the press and its employees are treated by Hampton, *Visions of the Press in Britain*, and Aled Jones, *Powers of the Press: Newspapers, Power and the Public in Nineteenth-Century England* (Aldershot: Scolar, 1996), and, for the Swedish part, by Lundell, *Pressen i provinsen*, Lundell, *Attentatet mot Hiertas minne*, and Jarlbrink, *Det våras för journalisten: Symboler och handlingsmönster för den svenska pressens medarbetare från 1870-tal till 1930-tal* (Stockholm: National Library, 2009). The French and the Anglo-American traditions are described in Jean K. Chalaby's "Journalism as an Anglo-American Invention: A Comparison of the Development of French and Anglo-American Journalism, 1830s–1920s," *European Journal of Communication* 11, no. 3 (1996).

### *Electric Media*

A modern classic when it comes to nineteenth-century electric media is Carolyn Marvin's *When Old Technologies Were New: Thinking about Electrical Communication in the Late Nineteenth Century* (New York: Oxford University Press, 1988). The significance of the gutta-percha and the backsides of globalization are discussed by John Tully in "A Victorian Disaster: Imperialism, the Telegraph, and Gutta-Percha," *Journal of World History* 20, no. 4 (2009). The idea that transport is separated from communication is developed in James Carey's "Technology and Ideology: The Case of the Telegraph" from 1983, which is found in the author's *Communication as Culture: Essays on Media and Society* (Boston: Unwin Hyman, 1989). Stephen Kern highlights the forcing effect of the telegraph on the outbreak of the First World War in *The Culture of Time and Space 1880–1918* (Cambridge, MA: Harvard University Press, 1983). The "rail or telegraph" quote is from Jonas Harvard's "Nya medier, gamla transporter," in *1800-talets mediesystem* (2010), 31; the essay offers a good introduction to and analysis of the telegraph as both imagined and actual communication technology.

### *A New Visual Culture*

The visual culture of the nineteenth century is an extensive and expanding field of research. A few important works are Tony Bennett's *The Birth of the Museum: History, Theory, Politics* (London: Routledge, 1995); Jonathan Carry's *Techniques of the Observer: On Vision and Modernity in the Nineteenth Century*

(Cambridge, MA: MIT Press, 1992); and the anthology *Cinema and the Invention of Modern Life* (Berkeley: University of California Press, 1995), edited by Leo Charney and Vanessa Schwartz. Wild west shows and circus performances in the Swedish countryside are discussed in Åsa Bharathi Larsson's *Colonizing Fever: Race and Media Cultures in the Late Nineteenth Century Sweden* (Lund: Media History, Lund University, 2016). The literature on world's fairs is huge; a good read is Alexander C.T. Geppert's *Fleeting Cities: Imperial Expositions in Fin-de-Siècle Europe* (Basingstoke/New York: Palgrave Macmillan, 2010). The Stockholm exhibition 1897 is treated from several media perspectives in *1897: Mediehistorier kring Stockholmsutställningen* (Stockholm: Swedish National Archive of Recorded Sound and Moving Images, 2006), edited by Anders Ekström, Solveig Jülich, and Pelle Snickars.

#### *Audiovisual Media – About the Past*

The quote on the Lumières' new invention is taken from the article "Undren på utställningen," *Stockholms-Tidningen*, 4 August 1897. On moving images as modern visual evidence in court, see Lawrence Douglas, "Film as Witness: Screening Nazi Concentration Camps before the Nuremberg Tribunal," *Yale Law Journal* 105, no. 2 (1995). The film *Nazi Concentration Camps* (1945) is available on YouTube.

#### *The Media of the Masses*

The quote from Vitalis Norström's book *Masskultur* (Stockholm: Hierta, 1910) is taken from page iv. Raymond Williams is quoted from *Culture and Society 1780–1950* (New York: Columbia University Press, 1958), 319. The former Swedish prime minister Per Albin Hansson wrote his article "Förbrytarehandböcker: Nick-Carter-litteraturens draksådd" in *Fram*, 3, 1909. Vladimir Ilich Lenin's pamphlet *What Is to Be Done?* (1902) can be found online at <https://www.marxists.org/archive/lenin/works/download/what-itd.pdf>.

Online, the BBC features an excellent site devoted to John Reith and the history of the broadcasting corporation: <https://www.bbc.com/historyofthebbc>.

#### *Mass Media as an Industry*

The disenchantment of the world was originally discussed in Max Weber's lecture "Wissenschaft als Beruf" held in 1917 at the University of Munich. In translated form the text has been repeatedly published: *Science as Vocation* (London: Unwin Hyman, 1989). Weber's notion has been challenged, for example, in *The Re-Enchantment of the World: Secular Magic in a Rational Age*, edited by Joshua Landy and Michael T. Saler (Stanford: Stanford University Press, 2009). Anthony Giddens is quoted from the book *Conversations with Anthony Giddens: Making Sense of Modernity* (Cambridge: Polity Press, 1998),

94. Milena B. Methodieva is quoted from her book chapter “The Debate on Parliamentarism in the Muslim Press of Bulgaria, 1895–1908,” in *The First Ottoman Experiment in Democracy*, edited by Christoph Herzog and Malek Sharif (Würzburg: Nomos Verlagsgesellschaft, 2016), 111. The quotes around the debates of *lectores* at the Tampa cigar factories were also published in the newspapers *Tampa Daily Times* and *La Gaceta* in November and December 1931. They are quoted, however, from Araceli Tinajero, *El Lector: A History of the Cigar Factory Reader* (Austin: University of Texas Press, 2010), 136. On African media history during the twentieth century, see James Brennan’s book chapter “Communications and Media in African History,” in *The Oxford Handbook of Modern African History* (Oxford: Oxford University Press, 2013), edited by John Parker and Richard Reid. Luke McKernan’s text “Sports Films” is quoted from *The Encyclopedia of Early Cinema* (London: Routledge, 2005), edited by Richard Abel, 876. Marshall McLuhan’s statement on newspapers and “datelines” is taken from *Understanding Media: The Extensions of Man* (1964; Cambridge, MA: MIT Press, 1994), 212. Friedrich Kittler writes about the *Mediengründerzeit* in his book *Gramophone, Film, Typewriter* (Stanford: Stanford University Press, 1999). The quote from John Philip Sousa originally appeared in the article “They Ask Protection,” *Washington Post*, 6 June 1906.

#### *Mass Media as Politics in the Twentieth Century*

The Swedish radio commentator Sven Jerring is quoted from *På min våglängd* (Stockholm: Wahlström & Widstrand, 1944), 8. Friedrich Kittler is quoted from his book *Gramophone, Film, Typewriter*, 243 and 96–7. For an in-depth study of Nazi German radio, see Nathan Morley, *Radio Hitler: Nazi Airwaves in the Second World War* (Stroud: Amberly Publishing, 2021). Orson Welles’s radio show *The War of the Worlds* (1938) can be found on Wikimedia Commons, [https://en.wikipedia.org/wiki/File:War\\_of\\_the\\_Worlds\\_1938\\_Radio\\_broadcast\\_full.flac](https://en.wikipedia.org/wiki/File:War_of_the_Worlds_1938_Radio_broadcast_full.flac). The quote from Lenin is often cited in histories of Soviet cinema; the original source seems to be his “Directives on the Film Business,” January 1922, found at <http://soviethistory.msu.edu/>. Tony Judt is quoted from *Postwar: A History of Europe since 1945* (New York: Penguin Press, 2005), 343–4. Rayford Logan wrote about media and race in *The Negro in American Life and Thought: The Nadir, 1877–1901* (New York: Dial Press, 1954). For further information about the classification of Swedes with the help of photography, see Ulrika Kjellman, “How to Picture Race? The Use of Photography in the Scientific Practice of the Swedish State Institute for Race Biology,” *Scandinavian Journal of History* 39, no. 5 (2014). The notion of an “optical unconscious” can be found in Walter Benjamin’s classic essay “The Work of Art in the Age of Mechanical Reproduction” (1935/36). Siegfried Kracauer is quoted from the essay “Photography” (1927), *The Mass Ornament: Weimar Essays* (Cambridge, MA: Harvard University Press, 1995), 58.

### *Mass Media Hardware: The Example of Japan*

More information on the Japanese electronics industry can be found in a book by Wataru Nakayama, William Boulton, and Michael Pecht, *The Japanese Electronics Industry* (Boca Raton: CRC Press, 1999). The history of the Sony Walkman is narrated in Paul du Gay et al., *Doing Cultural Studies: The Story of the Sony Walkman* (London: Sage, 1997). The history of the game *Space Invaders* is narrated in Geoff King and Tanya Krzywinska's *Tomb Raiders and Space Invaders: Videogame Forms and Contexts* (London: Tauris, 2006).

### *Everyday Media*

In her book *Écrire, calculer, classer: Comment une révolution de papier a transformé les sociétés contemporaines (1800–1940)* (Paris: La Découverte, 2008), Delphine Gardey has written a media history of the office; see also JoAnne Yates, *Control through Communication: The Rise of System in American Management* (Baltimore: Johns Hopkins University Press, 1989). Darren Wershler-Henry's study *The Iron Whim: A Fragmented History of Typewriting* (Toronto: McClelland & Stewart, 2005) has a lot to say about the social significance of the typewriter. On Friedrich Nietzsche's usage of a writing ball, see Dieter Eberwein, *Nietzsches Schreibkugel* (Schauenburg: Typoskript-Verlag, 2005). More information on the history of the passport can be found in Martin Lloyd, *The Passport: The History of Man's Most Travelled Document* (Stroud: Sutton, 2003). Orvar Lövgren has written extensively on everyday media, for example, in *Exploring Everyday Life: Strategies for Ethnography and Cultural Analysis* (Lanham: Rowman & Littlefield, 2016), published together with Billy Ehn and Richard Wilk. Lövgren is, however, quoted from his Swedish article, "Remedierad vardag: Mediebruk mellan rutin och dagdröm," *Mediekultur* 23, no. 42/43 (2007).

### *Remediation and Mobility*

The quote from McLuhan is taken from *Understanding Media*, 26. The term remediation was launched in David Bolter and Richard Grusin's *Remediation: Understanding New Media* (Cambridge, MA: MIT Press, 1998). Paul Levinson is quoted from his *Cellphone: The Story of the World's Most Mobile Medium and How It Has Transformed Everything!* (New York: Palgrave Macmillan, 2004), 16. Most things worth knowing about IBM are found in James W. Cortada, *IBM: The Rise and Fall and Reinvention of a Global Icon* (Cambridge, MA: MIT Press, 2019).

### *Analog and Digital*

Claude Shannon's master's thesis "A Symbolic Analysis of Relay and Switching Circuits" was originally published in *Transactions of the American Institute*

of *Electrical Engineers* 57 (1938) and can today be found on several sites online. Shannon and the concept of information is also a recurring theme in James Gleick's *The Information: A History, a Theory, a Flood* (London: Fourth Estate, 2011).

### *Calculating Machines as Media (or vice versa)*

More information on Babbage can be found in Anthony Hyman's *Charles Babbage: Pioneer of the Computer* (Oxford: Oxford University Press, 1982); on Hollerith see Geoffrey D. Austrian's biography *Herman Hollerith: Forgotten Giant of Information Processing* (New York: Columbia University Press, 1981). Alan Turing's article "On Computable Numbers" was originally published in *Proceedings of the London Mathematical Society* in November 1936 and is easily found online. The quote on Turing is cited from Andrew Hodges's *Alan Turing: The Enigma* (1983; Princeton: Princeton University Press, 2014), 137–8, and reads as follows: "What [Turing] had done was to combine such a naive mechanistic picture of the mind with the precise logic of pure mathematics. His machines – soon to be called Turing machines – offered a bridge, a connection between abstract symbols and the physical world. Indeed, his imagery was, for Cambridge, almost shockingly industrial." Information on the first general electronic computer can be found in Thomas Haigh, Mark Priestley, and Crispin Rope's *ENIAC in Action: Making and Remaking the Modern Computer* (Cambridge, MA: MIT Press, 2016).

### *Memex, Infrastructures, and Networks*

Vannevar Bush's article on the Memex is called "As We May Think" and was published in *The Atlantic*, July 1945. The quote from McLuhan is taken from his *Understanding Media*, 9. The first article on the ARPANET and a "computer virus" in Swedish press appeared in the article "23-åring slog ut USA:s datanät," *Dagens Nyheter*, 6 November 1988. The quote from Harry Schein is taken from his personal archive, located at Swedish Labour Movement's Archives and Library in Stockholm, "Föredrag vid svenska filmklubbens vårmöte den 17 maj 1961," manuscript, vol. 2:4, Harry Schein's personarkiv. All documents within the series *Request for Comments* (RFC) can be found online at [rfc-editor.org](http://rfc-editor.org).

### *Breakthrough of the PC*

The best book about the emergence of the personal computer and early computer culture in California is still Steven Levy's *Hackers: Heroes of the Computer Revolution* (New York: Anchor Press, 1984). Bill Gates's "An Open Letter to Hobbyists" was originally published in the *Homebrew Computer Club Newsletter* no. 2 (1976) and can be found online. More information about the research centre Xerox PARC is found in Michael A. Hiltzik, *Dealers of*



*Lightning: Xerox PARC and the Dawn of the Computer Age* (New York: Harper-Business, 1999).

### *World Wide Web*

Eric Schmidt's quote from 1993 is taken from "The Information Factories," *Wired*, 10 January 2006. There are many books on the development of the internet and the web, but one that can be recommended is Matthew Lyon and Katie Hafner's *Where Wizards Stay Up Late: The Origins of the Internet* (New York: Simon & Schuster, 1996). J.C.R. Licklider's *Libraries of the Future* (Cambridge, MA: MIT Press, 1965) is also an interesting read. Finally, Anna Crowley Redding's *Google It: A History of Google* (New York: Feiwel & Friends, 2018) has a lot of information on the development of Google.

### *The Social Significance of Computerization*

The quote from Langdon Winner is taken from his book chapter "Technologies as Forms of Life" in *Epistemology, Methodology and the Social Sciences*, edited by Robert S. Cohen and Marx W. Wartofsky (Dordrecht: Springer Science, 1983), 254–5. The quoted editorial was published as "Anden och maskinerna," *Dagens Nyheter*, 6 November 1977. The Swedish report from the Commission on the Effects of Computerization on Employment is originally called *Datorer och arbetslivets förändring* (SOU 1984:20), 32.

### *Mobile Devices – Social and Streaming Media*

A fine introduction to the media landscape of the 2000s is found in José van Dijck's *The Culture of Connectivity: A Critical History of Social Media* (New York: Oxford University Press, 2013). On Apple and the iPhone, see *Moving Data: The iPhone and the Future of Media* (New York: Columbia University Press, 2012), edited by Pelle Snickars and Patrick Vonderau, and on YouTube, see *The YouTube Reader* (Stockholm: National Library, 2009), edited by Pelle Snickars and Patrick Vonderau.

### *Digital Media Specificity and Big Data*

Viktor Mayer-Schönberger and Kenneth Cukier have a lot to say about big data in *Big Data: A Revolution That Will Transform How We Live, Work, and Think* (Boston: Eamon Dolan, 2013). On Spotify, see the book by Maria Eriksson, Rasmus Fleischer, Anna Johansson, Pelle Snickars, and Patrick Vonderau, *Spotify Teardown: Inside the Black Box of Streaming Music* (Cambridge, MA: MIT Press, 2019). Safiya Umoja Noble is quoted from *Algorithms of Oppression: How Search Engines Reinforce Racism* (New York: New York University Press, 2018), 4. On AI and carbon footprints, see Kate Crawford, *Atlas of AI* (New Haven: Yale University Press, 2021).



# INDEX

Page numbers in italics indicate references to illustrations.

- academic studies. *See* media studies
- acoustic telegraphy: overview, 140, 142; African drums, 46–8, 47, 279; bells, 67, 281; old/new continuities, 146–7, 150; religious messages, 66–7; strategies to clarify meaning, 46–7. *See also* sound; telegraphy
- administration: overview, 9–10, 40, 52; ancient cultures, 206; clay tokens, 38, 39–40, 42, 55; information overload, 64–5, 232, 280; legal practices, 52; literacy demands, 65–6; medieval period, 62–6, 63, 65, 206; military administration, 39, 206; oral contracts and agreements, 29; printing press's influence, 76–7; scrolls, 63; shorthand, 206; slave trade bureaucracies, 77; Vismann as a key thinker, 52. *See also* book-keeping; counting aids; empires; law and legal systems; postal systems
- administration and mass media: overview, 206–12, 250; calculators, 208; colonial telegraphy and radio, 170; computerization, 250–2; copiers (xeroxing), 202; feminization of office work, 210, 224, 250; folders, 206; form standards, 207, 209; legal practices, 52; microfilm, 210, 231, 232; old/new continuities, 271; paper size standards, 207, 210, 212; QWERTY keyboard, 208; stenography, 206–7; typewriters, 206–10, 208, 209, 244, 247, 289; Vismann as a key thinker, 52. *See also* identification systems; money; personal computers (PCs)
- Adorno, Theodor, 198
- advertising: absence in public service broadcasting, 165; big data, 266–7; church pulpit announcements, 75; consumer culture, 165; digital media, 254, 258, 262–3; film and video industries, 165, 178, 181; journalists in advertising, 138, 139; magazines, 174; mass media, 165, 174, 177; media convergence, 254, 260, 262; music industries, 177; newspapers and journals, 101, 130–1, 136, 138, 139–40, 151; photography, 130–1, 138, 139, 151; posters, 78, 178, 181, 184; press, 165; print capitalism, 136, 171; radio, 165, 188, 214; television, 165, 197; tobacco ads, 165. *See also* print capitalism
- Afghan war rugs, 55
- Africa: colonial administration, 170–1; drum language, 46–8, 47, 140, 279; empires, 46–8, 47, 279; literacy rates, 169, 170; mass media, 170–1; Nigeria, 170–1; tally sticks, 35, 36; Western dominance of media, 170–1
- agitprop, 161, 189. *See also* propaganda
- AI. *See* cybernetics and artificial intelligence (AI)
- Alexander the Great, coins, 56
- Alfvén, Hannes, 230
- algorithms: overview, 59–60; al-Khwarizmi's mathematics, 59, 59–60; biased algorithms, 266; big data, 266–7; micro targeting, 270; personalization of media, 265, 265–7; push- vs pull-driven, 259, 261; search engines, 249, 266; social media, 280. *See also* digital media
- Allen, Paul G., 239
- Amazon, 246, 266
- America. *See* United States
- analog media: overview, 86, 217–22; digital and analog media, 86, 218–22, 262; electric or chemical/mechanical vs electronic and numeric, 218, 221–2; examples, 86, 217–18; historical perspectives, 217–18; LP records, 177; manuscripts, 86; mass media (newspapers, radio, and TV), 173–4, 218–19; material vs immaterial, 218; media convergence, 219; old/new continuities, 218–19, 263–4; print, 86; remediation, 216–17; shift to digital, 216–18; technology-driven development, 175. *See also* digital media; media convergence; newspapers; radio; television
- ancient Greek and Roman culture: amplification of speech, 42–3; Arabic translations, 58–9; art reproductions, 154; books and libraries, 50–1, 53; coins, 50, 56, 154; gender roles, 48–9, 49, 51; Homeric memory techniques, 29, 30, 76; Innis as a key thinker, 45; legal systems, 52; media criticism, 49–50; oral communication, 18, 29, 30, 42–3, 48, 49–50; Peters as a key thinker, 18; postal systems, 43–4, 46; shorthand, 206; silent reading vs reading aloud, 48–9, 49, 50; Socratic dialogues, 18; tally sticks, 35, 36; theatres, 42–3; vase paintings, 49; women authors, 51; written vs oral communication, 18, 49–50
- Anderson, Benedict, 101, 281, 283
- animals: overview, 21–2; birds as messengers, 145, 184–5, 186; cave art, 33–4, 277–8; Dürer's rhinoceros (woodcut), 90; medium is the message, 21–2; sensory systems, 20–1; sign language, 24;

- signal systems, 20–1; sounds as communication, 23–4
- anthropological studies, 27, 30, 47, 176, 193
- Apple Inc.: overview, 238–42, 241, 255–6, 291; consumer market, 240–3, 241; founding of, 238–9, 239; genericized trademark, 202–3; information design, 241, 256; iPhones, 216, 217, 255, 255–6, 291; iPods, 203, 217, 256; mobility, 217; operating systems, 217, 240–1; personalization of media, 265–7. *See also* digital media; media convergence; personal computers (PCs); personal computers (PCs); industries
- Arabic culture: overview, 56–61, 89; book markets, 58; camera obscura, 68; exclusion from printing advances, 88–9; libraries, 56–9, 58, 61, 63–4; *Maqāmah* (short stories), 58; mosques with texts, 57; paper, 61; printing restrictions, 88–9; translation movement, 57–9. *See also* Islam; Middle East
- Arbeiter-Illustrierte-Zeitung*, 161
- archives. *See* libraries and archives
- Aristotle, 42, 51, 58, 68
- Armenia, printing, 89, 282
- ARPANET network, 219–20, 220, 233, 235, 237, 245, 247, 248
- art and media: overview, 9, 154; Benjamin as a key thinker, 154; cave art, 33–4, 277–8; change in meaning of art, 154; colour ranges, 151; Dürer's rhinoceros (woodcut), 90; German Neue Sachlichkeit art movement, 183; old/new continuities, 154; optical unconscious, Benjamin's, 196, 288; politicized art, 154
- artificial intelligence (AI), 21, 22, 205, 266–7. *See also* cybernetics and artificial intelligence (AI)
- Asia: counting words, 35; early history, 37; history of writing, 39–40; printing techniques, 96; Silk Roads, 54–6, 61. *See also* China; Japan; Korea
- astronomy: Big Bang as origin of universe, 11–12, 12, 14; calendars, 36, 41, 60; credibility of print information, 94–5; Galileo's *Sidereus nuncius*, 6, 94–5. *See also* sciences
- audio. *See* acoustic telegraphy; social and streaming media; sound; sound recordings and playback
- authorship: overview, 102–3; ancient Greece and Rome, 29, 50–1; control over dissemination, 103; copyright, 102–3, 136, 140, 175–6; oral cultures, 29; payments and royalties, 51, 103; piracy and plagiarism, 94, 102–3, 257; portraits in books, 102; reprints, 94–5, 102; women authors, 51
- Babbage, Charles, 222, 223
- Baghdad libraries, 57–9, 58, 61
- Baird, John Logie, 191
- Balkans, oral culture, 3, 27, 30
- bees as model for robots, 21
- Belgrade, Serbia, 3, 5, 271
- bells, 67, 281
- Benjamin, Walter (key thinker), 154, 196, 288
- Berliner, Emile, 174–5, 182
- Berners-Lee, Tim, 244–5, 245, 247, 256
- Berzelius, Jacob, 13
- Bible, 12–13, 61, 86, 88, 100, 104
- Big Bang as origin of universe, 11–12, 12, 14
- big data, 266–7. *See also* digital media; social and streaming media
- biomedia: overview, 19–22; DNA as storage medium, 19–20, 25; evolution of species, 14, 21–5; models for robots, 21
- birds as messengers, 145, 184–5, 186
- BlackBerry phones, 202
- blackletter, textura, or Gothic styles, 63, 83, 132
- Blaeu, Willem, 91
- block printing (woodcuts), 84, 86, 90, 96, 117
- bodies and communication: disembodied information, 205; faces and hands, 24; media as bodily extensions, 98, 100, 180; technology as body parts, 205. *See also* sensory systems
- bodies and cybernetics. *See* cybernetics and artificial intelligence (AI)
- Bonnier, Eva, 130
- bookkeeping: clay tablets, 37–41; clay tokens, 38, 39–40, 42, 55; computerization, 250–2; history of writing, 37–42, 278; Inca talking knots, 71–3, 72, 281; tally sticks as receipts, 35, 36. *See also* administration; money; writing
- books: overview, 95–6; ancient Greece and Rome, 50–1, 53; Bible as bestseller, 100; book terminology, 95–6; booksellers as publishers, 50; codex format, 53, 63, 96, 129; communications as shapers of events, 110; consumer culture, 101; Darnton as a key thinker, 110; Frankfurt Book Fair, 101; historical perspectives, 95–6; as mundane, 215; old/new continuities, 271; power relations, 95; print capitalism, 101, 112; scrolls, 53, 63, 67; social hierarchies, 95, 102. *See also* authorship; images in print; libraries and archives; literacy; narratives; print capitalism; print culture; readers and reading
- Boyle, Robert, 99, 100
- Brahe, Tycho, 94, 283
- Brand, Stewart, 244
- Brin, Sergey, 248
- Britain. *See* United Kingdom
- British Museum, 126, 127, 151–2
- broadcasting. *See* media convergence; public service broadcasters; radio; television

- Bruno, Giordano, statue, 127–8, 128, 285
- Buddhism: beads as counting aid, 36; music, 280–1; prayer wheels and flags, 66; print copies of texts, 66, 280; temples and statues, 66. *See also* religion and spirituality
- Bulgaria, 165
- bureaucracies. *See* administration
- Bush, Vannevar, 223–5, 231–2, 248, 290
- businesses. *See* administration
- cables and wires: cable TV, 233–5; map of networks (1901), 143; media convergence on cables, 269; switchboard operators, 148–9, 148; telegraphy and telephony, 142, 143, 144, 145–7, 147. *See also* telegraphy; telephony
- calculators. *See* computers, historical perspectives
- calendars, 36, 41, 60. *See also* time
- calotypes, 116
- camera obscura, 68–70, 69, 281
- Canada: public service broadcasting, 165; sports journalism, 172
- capitalism and media industries. *See* advertising; consumer culture; film and video industries; music industries; personal computers (PCs), industries; print capitalism
- Cappiello, Leonetto, 184
- carrier pigeons, 145, 184–5, 186
- cartomania (visiting cards), 96, 112, 150–1
- Castells, Manuel (key thinker), 246
- Catholic Church: index of banned titles, 108; Middle Ages, 63, 63–4, 65; missionaries (Propaganda Fide), 161; monks, 62, 63; reading and statue inaugurations, 127–8, 128, 285; Virgin Mary as reading model, 70. *See also* Christianity
- cave art, 33–4, 277–8
- ensorship: Catholic index of banned titles, 108; constructive aspects, 284; film censorship, 162; freedom of the press, 107–8; print culture, 169; wartime radio, 185, 187–9, 187
- Cerf, Vint, 235, 237
- Cervantes, Miguel: *Don Quixote*, 102
- China: administration, 60–1; Chinese characters and printing, 84; clay pots and writing systems, 42; clay tokens, 42; counting aids, 35; earliest book, 84; empires, 60–1, 71; money, 56, 212, 213; paper, 60–1, 84, 93; printing on fabric and paper, 56, 66, 83–4, 212, 213; silk as currency, 56; translations into Arabic, 57, 60; writing system, 39–40. *See also* Asia
- Christianity: acoustic media, 67, 281; Annunciation, 70; beads as counting aid, 36; competitiveness, 67; God as invisible power, 39–40; Gospels as mass communication, 18; imagery, 67–8, 74, 74, 98; mandatory attendance, 75; multimedia church services, 67–8, 80; origin of the world, 12–13; Peters as a key thinker, 18; pulpits, 74, 75, 80, 104, 281; vernacular languages, 76, 100, 104. *See also* Catholic Church; Protestant churches; religion and spirituality
- Christianity, writing: abstract ideas in written culture, 31, 39–40; Bible, 12–13, 61, 86, 88, 100, 104; codex format, 53; control of interpretations, 109; copyists and scribes, 62, 63; Gutenberg Bible, 61, 86, 88; illuminated books, 68; libraries, 63, 63–4, 65; literacy, 109; missionary publications, 170; printing houses, 100; Virgin Mary as reading model, 70; writing on coins, 56
- Cicero, 206
- cinema. *See* film and video
- Clanchy, Michael T., 61–2, 65–6
- Clarke, Arthur C., 230
- class. *See* social hierarchies
- clay tablets, 37–43, 38, 45. *See also* writing; writing materials
- cloth. *See* fabric and textiles
- cloud computing, 254
- code and cipher systems: codebreaking in war, 182, 184, 226–7, 227; computer development, 184; Morse code, 142, 221
- codex format, 53, 63, 96, 129
- coins. *See* money
- Cold War, 233, 269
- colonial media: overview, 193; anthropological studies, 27, 30, 47, 176, 193; media history, 170; printing technologies, 89–90, 93; treaties on parchment, 61. *See also* administration; empires
- commercial. *See* advertising
- communications: overview, 11, 20–1; direct vs indirect, 165; simultaneous processes, 165; social hierarchies, 141; two-way communications, 4, 141, 253, 269. *See also* internet; media convergence; telegraphy; telephony
- computers: analog and digital media, 218–22; convergence with networks, 253–9; economic history, 229–30; fictional dystopias, 230; information overload, 232; Marxist approach, 246; metals and compounds, 17; as multimediam, 216, 219, 259; personal computers, examples, 216; remediation, 216–17; silicon components, 13–14; social processes, 249–53. *See also* personal computers (PCs); personal computers (PCs), industries
- computers, historical perspectives: overview, 222–30; analog computers, 223–5; ARPANET network, 219–20, 220, 233, 235, 237, 245, 247, 248; ARRA I and II, 228–9; Babbage's calculator, 222, 223; binary systems, 222–6, 228; bitmaps,



- 230; calculating machines, 222–8, 223–5, 232, 243, 250; *Computer Networks* (film), 235; economic history, 229–30; electromechanical data processing, 222–5, 223–5; electronic computers, 227–8; ENIAC as first, 226–8, 227; first program, 222; hyperlinks, 232; IBM, 217, 224, 229, 229–30, 232; information management, 231–2; mainframe computers, 217, 219–20, 220, 229, 232, 249–50; Memex device, 231, 231–2, 248, 290; military and media development, 182–4, 225–8, 227, 231–3, 250; programmable technology, 228, 231, 239; punch cards, 222–5, 223–5, 228, 272; science fiction as critique, 230; Shannon's theoretical work, 11, 20, 205, 221, 225, 235; start-ups, 230; terminal computers, 220, 232, 250; Turing's theoretical work, 183–4, 225–7, 232, 290; visionaries, 230, 235; women, 222, 224, 226–7, 227
- Congo, tally sticks, 35, 36
- consumer culture: overview, 101–2; department stores, 112; film industry, 167–8; late modern (19th c.), 111–12, 114; mail-order trade, 112; mass media audiences, 269–70; mass media forms, 165; mass media industries, 167–8; modernity, 167–8; newspapers, 101, 138, 139–40; packaging as mass medium, 112; print capitalism, 101, 165; theatres, 101. *See also* advertising; everyday life; mass media
- convergence of media. *See* media convergence
- Copernicus, Nicolaus, 98
- copyists. *See* manuscripts, copyists and scribes
- copyright, 102–3, 136, 140, 175–6, 256
- corporality. *See* cybernetics and artificial intelligence (AI)
- cosmic radiation, 11–12, 12
- Couffignal, Louis, 228
- counting aids: overview, 34–6, 278; calendars, 36, 41, 60; clay tokens, 38, 39–40, 42, 55; early history, 34–6, 35; fingers, joints, and fingernails, 34–6; media as extensions of senses, 98, 100, 180; number words, 34–5; numerical signs, 39; one-to-one correspondence, 34–5; paper, 35–6; prayer beads, 36; stones, seeds, and shells, 34–6; tally sticks, 35, 36. *See also* administration; bookkeeping
- couriers. *See* messengers and messages; postal systems
- Cuba: reading aloud, 169–70, 169
- currency. *See* money
- cybernetics and artificial intelligence (AI): overview, 205; artificial intelligence, 21, 22, 205, 266–7; cyborgs (fictional characters), 205; disembodied information (internet or DNA), 205; Hayles as a key thinker, 205
- daguerreotypes, 112, 114, 115, 116, 167. *See also* photography
- Darnton, Robert (key thinker), 4–5, 96, 110
- Darwin, Charles, 14, 24–5
- data, big, 266–7. *See also* digital media
- dead media, 72, 164
- debate, public. *See* politics; public sphere
- Denmark, 61, 132. *See also* Scandinavia
- Diderot's *Encyclopédie*, 92, 93
- digital media: overview, 86, 216–22, 261–7; analog and digital media, 218–22, 262; big data, 266–7; computers as multimediality, 216, 219, 259; constantly changing content, 262; convergence, 219, 253, 259, 261–3; electric telegraphy, 221; electronic media, 218–22; Ernst as a key thinker, 164; industrial collection of personal data, 216; mathematical and numeric basis, 220–3; media archaeology, 164; medium is the message, 180; mobility, 216–17; news flow, 262; old/new continuities, 218–19, 263–4; personalization of, 263–7, 265; print media, 86; remediation, 216–17; shift from analog to digital, 86, 216; shift from print to digital, 180. *See also* algorithms; computers; computers, historical perspectives; internet; media convergence; personal computers (PCs); personal computers (PCs), industries
- DNA as storage medium, 19–20, 25
- Dogon people, 13
- dreams, 68
- drum language, African, 46–8, 47, 140, 279. *See also* acoustic telegraphy
- Dürer's rhinoceros (woodcut), 90
- earth sciences: Big Bang as origin of universe, 11–12, 12, 14; geological layers as media, 14; geomediality, 13–19; metals and compounds in computers, 17–18; radioactivity and time spans, 14; rocks as records, 14; silicon, 13–14, 17. *See also* sciences
- economies and media industries. *See* film and video industries; music industries; personal computers (PCs), industries; print capitalism
- Edelcrantz, Abraham Niclas, 140, 142
- Edison, Thomas, 167, 171, 174–5, 182
- Egypt: cinemas, 166; hieroglyphs, 39–41, 41, 71; history of writing, 39–43, 41; library of Alexandria, 43; stone monuments, 41–3. *See also* Middle East
- Eisenstein, Elizabeth (key thinker), 85, 90, 284
- Eisenstein, Sergei, 189
- electric media: overview, 141–2, 150; electric lights, 141, 149, 150; electronic and numeric vs electric, 218–22; entertainment, 149–50; Marvin as a key thinker, 141; old/new continuities, 141, 150;

- social hierarchies, 141; spectacles, 149–50; speed of electricity, 142–3, 145; telegraphy, 221; teleprinter, 142. *See also* telegraphy; telephony
- electronic media: cassette recorder and radio (Walkman), 201–4, 202, 217, 289; digital media, 218–22; electronic and numeric vs electric, 218–22; electronic waste, 19; Japanese companies, 200, 200–4, 202, 204; media convergence, 203, 260–2; mobility, 201–2; Philips electronics industry, 199, 199; transistor technology, 201; videotape format war (VHS vs Betamax), 201. *See also* digital media; games
- empires: overview, 43–8, 71; administration, 44, 46, 76–7; African, 46–8, 47, 279; breakdowns, 48; Chinese, 60–1, 71; drum systems, 46–8, 47, 279; identity of messengers, 46; Inca, 71–3, 72, 281; legal systems, 52; mobility of media, 45; Persian, 7, 43–4, 46, 48, 56–7, 59, 278; postal systems, 43–4, 46; printing press, 76–7; surveillance systems, 40, 44, 71; writing on coins, 56–7. *See also* administration
- Engelbart, Douglas, 230, 241
- Engelbrekt, statue, 127–8, 128, 285
- England. *See* United Kingdom
- ENIAC as first computer, 226–8, 227
- Enlightenment: ideologies (-isms), 116; newspapers, 119; print culture, 90–1, 93, 103, 119; public sphere, 106–8, 116, 119
- environment: Anthropocene, 17; carbon footprint of AI, 266–7; electronic waste, 19; latex use in underwater cables, 142, 143; newspapers as waste, 129, 135; recycling systems, 19
- Ernst, Wolfgang (key thinker), 164
- ethnology, 176, 215
- eugenics, 193–6, 194, 195
- Europe: Americanization of media, 159–63, 160, 166–7, 178–82, 179; anti-modernism, 159–60; computerization, 250–3; dubbed and subtitled media, 166–7; film censorship, 162; illustrated newspapers and journals, 130–1; internet development, 233; labour movement, 158–61; literacy rates, 168–9; mass media, 159–63, 160, 166–7; media convergence, 261–2; military and media development, 182–4, 225–8, 250; multimedia festivals, 79–80; news agencies, 136; personalization of media, 265, 265–7; political press, 158–9; public service broadcasting, 261; radio, 188; street lights, 149; surveillance and privacy, 251–2, 265, 265, 266; telephones, 147; university systems, 75–6. *See also* France; Germany; Netherlands; Scandinavia; United Kingdom
- Europe, Eastern: Balkans, 3, 27, 30; oral culture, 3, 27, 30; Soviet radio, 187, 188–9. *See also* Soviet Union
- everyday life: overview, 10, 79–83, 206–15, 269–73; big data, 266–7; computerization, 250–3; documentary film, 156; early modern (19th c.), 112, 114, 119; film archives, 156; graffiti, 51–2, 53, 79; individualized media consumption, 212; mass media as mundane, 212, 214–15; media as invisible, 10, 214–15, 251–2, 271; news flow, 262; newspapers as waste, 129, 135; offices, 250; oral culture, 32; photographs, 112; scrapbooks, 129, 137. *See also* administration; fabric and textiles; identification systems; mass media; money; postal systems
- evolution of species, 14, 21–5
- Exeter Hall, London, 120
- exhibitions, 134, 153, 155
- fabric and textiles: overview, 54, 55, 279–80; Afghan war rugs, 55; Christian imagery, 67–8; as currency, 56; motifs, 55; paper from rags, 45, 61, 112; punch card weaving looms, 222, 272; silk, 54, 56; text, etymology, 54; women as producers, 54; as written texts, 43, 54
- Facebook, 254, 256, 258, 261–4, 267, 270. *See also* social and streaming media
- females. *See* gender/sex; women
- fiction. *See* narratives; oral narratives
- file sharing (P2P), 256–7, 257, 261–2
- files and records. *See* administration
- film and video: overview, 156, 166–7; archives, 156; Benjamin as a key thinker, 154; cameras, 155–6; censorship of, 162; *Citizen Kane*, 181, 182; court evidence in Nuremberg trials, 156–7, 287; documentary capacity, 156; dubbed and subtitled media, 166–7; file sharing (P2P), 256–7, 257, 261–2; as historical sources, 155–6; individual interpretations, 156–7; Marvin as a key thinker, 141; mass audiences, 269–70; media convergence, 203, 260; modernist aesthetics, 191; newsreels, 156–7, 189–90; old/new continuities, 4, 141, 263–4; politicized art, 154; racism, 191–2; radio links to, 188; silent films, 178–9, 196; sound film, 166; symbiosis of hardware and software, 177; time axis manipulation, 156; user-generated content, 254, 256, 258, 260, 261. *See also* media convergence; social and streaming media; video recordings and playback
- film and video industries: overview, 177–82, 181; advertising, 165, 178, 181; Americanization of global industry, 160–3, 166–7, 177–82, 179, 189; cable TV, 234–5; filmmaking, 122, 123; Hollywood, 160, 166, 177–82, 188, 191, 196, 198–9; Lumière brothers, 155–6, 164, 166; mass media, 157, 163, 177–82, 179, 269; media convergence, 203, 260; military and media development, 182–4; movie theatres and cinemas, 166;

- non-Western film industries, 170; Pathé Frères, 167, 172, 177–9, 178; pay TV, 234–5; sports journalism, 171–3; vertical integration, 177–8. *See also* media convergence; social and streaming media; video recordings and playback
- Finland: *Kalevala* as national epic, 27–8, 29, 32; mobile phone industry, 203; public service broadcasting, 165. *See also* Scandinavia
- First World War, 144–5, 182–3. *See also* war and peace
- fonts, typefaces, and typesetting: antikva (Roman characters), 132; blackletter or Gothic, 63, 83, 132; as handwriting, 86; typesetters, 139–40
- France: cinemas, 166; computers, 228; daguerreotypes, 115; exhibitions, 153, 155; fonts, 132; French Revolution, 73, 82–3, 108, 110; magazines, 192; magic lanterns, 111; mass media, 168, 192; media-related workers, 78, 79; multimedia communications, 81–3, 110; news agencies, 136; newspapers, 131–2, 136, 168; oldest photo, 113; oral communications, 110; Pathé Frères industries, 167, 172, 177–9, 178; printworks, 88; public service broadcasting, 165; public sphere, 107, 108; radio, 187; street lights, 149
- Frankfurt Book Fair, 101
- Frankfurt School, 198
- Fukuyama, Francis, 219
- Galilei, Galileo: *Sidereus nuncius*, 6, 94–5
- games: overview, 203–4; media convergence, 203, 260; Nintendo's video games, 200, 201, 203, 204; Sony's PlayStation console, 203; *Space Invaders*, 203–4, 204; virtual reality, 241
- games and sports. *See* sports
- Gates, Bill, 230, 239–40, 244, 257, 290. *See also* Microsoft Corporation
- gender/sex: access to education, 51; ancient cultures, 49, 49; big data, 266–7; cave images and patterns, 33; feminism, 205, 266; feminization of office work, 209, 210, 224, 250; fertility symbols, 33; posthumanism, 205; relationship of reader and author, 48–9; telephony and gender roles, 148–9. *See also* women
- genomic sequencing, 19–20
- geomedia, 13–19. *See also* earth sciences
- Germany: *Arbeiter-Illustrierte-Zeitung* (magazine), 161; Berlin Olympics (1936), 7, 190–1; colonial media, 193; computers, 226; dubbed and subtitled media, 166–7; film theatres, 166–7; Frankfurt Book Fair, 101; illustrated newspapers, 131; magazines, 173; mass media, 168, 173, 184; military and media development, 182–4, 225–8; Neue Sachlichkeit art movement, 183; news agencies, 136; newspaper fonts (blackletter), 132; photojournalism, 161; political press, 158, 161; press history, 134–5; radio, 184; television, 7. *See also* Nazi Germany
- Gerston, Esther, 227
- Ghana, 46, 47
- Giddens, Anthony, 168
- Gilgamesh, 40–1, 278
- Ginzburg, Carlo, 109
- Gitelman, Lisa, 6–7, 271–2
- Google LLC: overview, 248–9, 253–4; advertising, 254, 258; algorithms, 248–9, 249, 266; archives, 264; biased algorithms, 266; big data, 266–7; founding of, 247–9; information services, 253; media convergence, 253–8, 262–4; mobility, 217; statistics, 249
- Gordon, Gloria Ruth, 227
- gossip and rumours, 26, 29, 32, 76, 82–3, 110, 148. *See also* oral culture
- government: freedom of the press, 107–8; Louis XIV's multimedia performances, 81–2; old/new continuities, 82; print capitalism, 100; public opinion, 124–5; regulation of networks, 237, 246, 257; voting rights, 121, 158. *See also* law and legal systems; politics
- graffiti, 51–2, 53, 79
- gramophones, 174–5, 183, 184. *See also* sound recordings and playback
- Great Britain. *See* United Kingdom
- Greece, ancient. *See* ancient Greek and Roman culture
- Gutenberg, Johannes, 61, 84–6, 88–91, 95
- Habermas, Jürgen (key thinker), 105
- handwriting, 5, 63, 83, 132. *See also* manuscripts; manuscripts, copyists and scribes; writing
- Hansson, Per Albin, 159–60
- Harper's Weekly*, 132, 133
- Hayles, N. Katherine (key thinker), 205
- hearing. *See* sensory systems; sound
- Hearst, William Randolph, 171, 182
- Heartfield, John, 161
- Herodotus, 7–8, 43–4
- hierarchies, social. *See* social hierarchies
- hieroglyphs, 39, 41, 71
- historical perspectives: overview, 3–6, 9–10, 269–73; assumptions of media importance, 127–9, 140; benefits, 272–3; biomedica, 19–22; books, 95–6; centres/peripheries, 10; communications as shapers of events, 110; cultural models, 5–6; distinct vs continuities, 5; diversity of technologies, 17; Ernst as a key thinker, 164; feedback of media, 110; geomedia, 13–19; interdependence of media, 110; media archaeology, 16–17, 22, 72, 164; media convergence, 110, 253, 259–62; social hierarchies, 110, 141; sources, 91, 125–9, 126, 137; technical limitations of a medium, 164;

- technological determinism, 164; variations in linguistic concepts, 95–6, 219. *See also* computers, historical perspectives; internet, historical perspectives; media; media studies; old/new continuities; progress narratives
- Hollerith, Herman, 222, 224, 290
- Holmdel Horn Antenna, New Jersey, 12
- Homer, 29, 30, 76
- Horace, 42, 51, 278
- Horkheimer, Max, 198
- IBM industries, 217, 224, 229, 229–30, 232, 240, 266
- Iceland: literacy, 65–6; public service broadcasting, 165
- identification systems: legitimacy of messengers, 44, 46; passports, 77, 210–11, 212, 262, 289; photographs, 210–11, 262; printing press, 77
- identities, national. *See* national identities
- images in print: overview, 96–7, 97; books, 116; Christian images, 67–8, 74, 74, 98; copper engravings, 96; etchings, 96; Islamic restrictions, 60; literacy, 96–7, 97, 99; lithographs, 96, 115, 146, 151, 154; manuscripts, 58, 86, 91; newspapers and magazines, 130–1, 136, 140, 153, 161, 174, 196, 269; print shops specializing in, 96; science, 96–7, 97, 99; woodcuts (block printing), 84, 86, 90, 96, 117. *See also* photography; print culture
- imagined communities, 75, 101, 104, 281, 283
- Incas: sound and creation, 13; talking knots (khipu), 71–3, 72, 281
- Innis, Harold (key thinker), 41, 45
- Instagram, 258, 261, 263, 270. *See also* social and streaming media
- internet: overview, 233–7, 244–9; accountability, 257; big data, 266–7; Castells as key thinker, 246; cloud computing, 254; convergence with computers, 253–9; development of, 232–7; dotcom companies, 247–8; emails, 235–7, 247; fake news and trolls, 237, 262; FTP (file transfer protocols), 237; grassroots networks, 237–8; hyperlinks, 245; idealism, 182; junk mail, 236; Marxist approach, 246; media convergence, 219, 253, 259–62; military and academic traditions, 233; online economy, 254, 258, 260; personalization of content, 263–7, 265; political uses, 237; power relations, 246; regulation of, 237, 246, 257; search engines, 248–9, 249, 263–4; sharing principle, 247; significance of, 233, 244, 249; streaming media, 219, 254, 258–9, 264, 267, 291; surveillance technologies, 251–2, 265, 266; TCP/IP protocols, 235–6, 244, 248, 263; telephone systems, 237–8; user-generated content, 254, 256, 258, 260, 261; viruses, 233; visionaries, 237; Web 2.0, 258, 261; web browsers, 245, 247–9, 249, 263–5; World Wide Web, 244–9, 256, 291. *See also* media convergence; mobility; networks; social and streaming media
- internet, historical perspectives: ARPANET network, 219–20, 220, 233, 235, 237, 245, 247, 248; Memex device, 231, 231–2, 248, 290; RFCs (Request for Comments) as sources, 235–7; telephone lines, 149
- Iran: clay tokens, 37–9, 38; mass media (1970s), 48, 279; mosques, 57
- Islam: abstract ideas in written culture, 31, 39–40; acoustic media, 67; calligraphy, 60, 88–9, 282; competitiveness, 67; mosques, 57, 60, 67; Muhammad, 56, 59, 60; oral culture, 60; Quran, 13, 57, 57, 60, 280; restrictions on imagery and print, 60, 88, 282; sound and creation, 13; translations, 58; writing on coins, 56. *See also* Arabic culture; religion and spirituality
- Italy: paper mills, 93; print capitalism, 103
- Japan: Americanization of media, 160, 166–7, 179; clay pots and writing systems, 42; film industry, 179; home electronics companies, 200, 200–4, 202, 204; kabuki theatre, 117; photography, 117; printing of Buddhist prayers, 66; public service broadcasting, 165
- Jenkins, Henry (key thinker), 260
- Jews. *See* Judaism
- Jobs, Steve, 230, 238, 240, 255. *See also* Apple Inc.
- Johannesson, Olof, 230
- Johns, Adrian, 283
- journalism: overview, 132, 134; copyright, 136; filter bubbles, 263–4; fourth estate, 117; international congresses, 134, 149–50; journalists in advertising, 138, 139; journalists in fiction, 134; news flow, 262; objectivity, 136, 145; old/new continuities, 117, 263–4; professionalization, 132, 134; progress narrative, 95; sensationalism (yellow press), 132; sports journalism, 171–3; as “the press,” 116–17, 125, 132, 134; women journalists, 134. *See also* magazines and journals; newspapers
- Jud Süß* (film), 189, 190
- Judaism: abstract ideas in written culture, 31, 39–40; anti-Semitism, 189, 190, 191; God as invisible power, 39–40; reading in ritual context, 43; scrolls, 53; sound and creation, 12–13; Torah, 12–13. *See also* religion and spirituality
- Judt, Tony, 188
- kabuki theatre, 117
- Kaiser-Panoramas*, 152
- Kalevala*, Finnish epic, 27–8, 29, 32
- Kant, Immanuel, 106

- Kapor, Momo, 3  
 key thinkers, vii, 10  
 Khwarizmi, Muhammad ibn Musa al-, 59–60, 59  
 Kircher, Athanasius, 17, 69, 122, 123  
 Kittler, Friedrich, 156–7, 164, 173–4, 183–4, 269  
 knowledge distribution and transmission: overview, 93–4; file sharing, 256–7, 257, 261–2; Inca talking knots, 71–3, 72, 281; information overload, 64–5, 121, 232, 280; Jewish culture and historical memory, 43; losses of information, 232; print culture, 93–4; reading aloud, 48–9, 49, 169, 169–70; religious ritual use of texts, 43  
 knowledge production: abstract ideas in written culture, 31, 39–40; changing systems and contexts, 92–3, 95; credibility of print information, 94–5; linguistic concepts of print, 95–6; military and media development, 182–4, 225–8, 227, 233, 250; oral vs written, 18, 31, 39–40; progress narrative, 95; stability of print information, 90–1, 94–5, 98, 103  
 knowledge storage: big data, 266–7; digital data, 252; DNA, 19–20, 25; earth, 17, 19; fabric and textiles, 51; historical phases, 183; human memory, 32, 34; Inca talking knots, 71–3, 72; media convergence, 260; punch cards, 222–5, 224, 225, 228; ritual use of texts, 43; written texts, 43. *See also* libraries and archives; manuscripts; memory; sound recordings and playback; video recordings and playback; writing  
 Korea: counting aids, 35; Hollywood film productions, 179; printing presses, 84  
 Kracauer, Siegfried, 196, 198  
 Krämer, Sybille (key thinker), 15, 272–3  
 Kubrick, Stanley, 230  
  
 languages: overview, 115–16; Arabic translations, 57–8, 64, 89; boundaries for thought, 115–16; codification in dictionaries and grammars, 104; dialects, 104; dubbed and subtitled media, 166–7; language shifts (18th and 19th c.), 115–16; Latin, 67, 76, 80, 104; translations, 57–8, 60–1, 64, 103–4, 166–7; vernacular, 65, 76, 100, 104, 283  
 Latour, Bruno, 94  
 laughter, 23  
 law and legal systems: overview, 52, 61–2; copy-right, 102–3, 136, 140, 175–6, 256; court scribes, 62–3; film as court evidence, 156; freedom of the press, 107–8; information overload, 64–5, 280; Middle Ages, 61–2; Nuremberg trials, 156–7, 287; old/new continuities, 61, 62, 271; Roman empire, 52; treaties, 61; Vismann as key thinker, 52; writing as an “act,” 52, 62  
 Lazarsfeld, Paul, 198  
 le Bon, Gustave, 158, 162  
 Legrand, Paul: *Le Rêve*, 153  
 Lenin, Vladimir, 161, 189, 287, 288  
 letters. *See* postal systems  
 Levinson, Paul, 217  
 libraries and archives: overview, 63–5, 65; access by readers, 64–5, 65; ancient Greece and Rome, 50–1; anthropological studies, 27, 30, 47, 176, 193; Arabic culture, 56–9, 58, 61, 63–4; British Museum, 126, 127; Christian culture, 63–4; compilations of text passages, 64, 85, 103; computers, 248; Ernst as key thinker, 164; formats before printing, 64; information overload, 64–5, 280; late modern era (19th c.), 111–12; library of Alexandria, 43; *Maqāmah* (Arabic culture), 58; microfilm, 210, 231, 232; reading aids, 64–5; security systems, 65; sound recordings, 176. *See also* museums  
 Licklider, J.C.R., 248  
 lights, street, 149  
 Lind, Jenny, 114  
 linear perspective, 68–71, 281  
 literacy: overview, 107–11, 168–70; administrative demand for, 65–6; ancient Greece and Rome, 48–51, 49; early history, 38–9; early modern period, 65–6, 102, 109; electric literacy, 141; gender roles, 48–9, 49; images in print, 95–7, 97, 99; late modern period, 169; limited literacy in isolated areas, 65–6; newspapers, 131, 168–9; printing’s impact on increases, 109; readers and writers for hire, 79; reading aloud in factories, 169, 169–70; social hierarchies, 65, 95, 141. *See also* readers and reading  
 literature. *See* narratives; oral narratives  
 lithographs, 96, 115, 146, 151, 154  
 Löfgren, Orvar, 215  
 Lönnroth, Elias, 28, 29, 277  
 Lord, Albert, 27, 30  
 Lorenz, Konrad, 20  
 Lovelace, Ada, 222  
 Lumière brothers’ camera, 155–6, 164, 166  
 Lundborg, Herman, 193, 194–5  
 Luther, Martin, 76, 80, 82, 98, 100  
  
 Ma, Kevin, 21  
 magazines and journals: overview, 161, 173; advertising, 174; *Arbeiter-Illustrierte-Zeitung*, 161; *Harper’s Weekly*, 132, 133; illustrated magazines, 161, 174, 192, 196, 269; journals, 132, 133; labour movement, 161; *The Ladies’ Home Journal*, 174; *Life and Look*, 161; as mass media, 161, 163, 173, 196, 269; *Le Petit Journal*, 192; photojournalism, 161  
 magic lantern shows, 111, 152, 269–70  
 management systems. *See* administration  
 Manovich, Lev, 262



- manuscripts: overview, 86; analog vs digital techniques, 86; Arabic translations, 57–8, 64, 89; compilations, 64, 85, 103; copying of, 57–8, 62, 84; fragility and instability, 85, 90; hybrid medium, 86; Icelandic vernacular transcripts, 65; illustrated manuscripts, 58, 62, 86, 91; old/new continuities, 86, 91; written form as decision, 62
- manuscripts, copyists and scribes: overview, 62–3; administration, 44, 62–3; ancient Greece and Rome, 50; Arabic culture, 57–8, 58, 89; blackletter, textura, or Gothic letter styles, 63, 83, 132; Buddhist practices, 66; Christianity and writing, 62, 63; clerical vs administrative scribes, 62–3; Egyptian deity of scribes, 41; empire administration, 44; guilds, 89; Middle Ages, 62, 63; printing press as change agent, 85, 89; reading-transcribing process, 57–8
- maps, 91, 98, 143, 185, 186
- Maqāmah* (al-Hariri of Basra), 58
- Martial (Roman poet), 50–1, 53
- Martinville, Edouard-Leon Scott de, 174–5
- Marvin, Carolyn (key thinker), 141
- Marxists, 154, 158, 198, 246
- mass media: overview, 157–67, 215, 269–73; Americanization of, 159–63, 160, 166–7, 178–82, 179; analog and digital media, 173–4, 218–22; anti-Semitism, 189, 190, 191; audiences, 269–70; big data, 266–7; censorship, 162; as commonplace, 214, 251–2; concepts, 157, 163, 219; device-driven development, 217–18; direct vs indirect communication, 165; education of the masses, 162–3; Ernst as key thinker, 164; labour movement, 158–61; literacy rates, 168–9; masses as a threat, 157–9, 162–3, 167–8, 196; as mundane and ordinary, 212, 214–15; national identity, 163; news flow, 262; newspapers, 170–3; newsreels, 156–7, 189–90; Nuremberg trials, 156–7, 287; old/new continuities, 219, 261, 263–4, 270–3; personalization of digital media, 263–7, 265; Peters as key thinker, 18; photojournalism, 161; political propaganda, 160–2, 189–93, 269–70; pulp fiction, 159–60, 160, 168; push- vs pull-driven media, 259, 261; research studies, 196; scope and scale, 163; sports journalism, 171–3; US anti-black racism, 191–3, 192; use with other activities, 214–15. *See also* administration and mass media; film and video industries; magazines and journals; music industries; propaganda; sound recordings and playback
- McLuhan, Marshall: form's impact on understanding content, 180; interplay of media, 216; as key thinker, 180; media as extensions of senses, 98, 100, 180; medium is the message, 21, 31, 121, 180; new electric Age of Information, 232; society's image as a series of events, 173; technology and social change, 197
- media: overview, 5–9, 269–73; analog and digital media, 218–22; assumptions of importance, 127–9, 140; combined modalities, 6; concepts, 7–9, 36, 125, 157, 163, 219; cultural models of history, 5–6; direct vs indirect communication, 165; as extensions of senses, 98, 100, 180; key thinkers, vii, 10; Krämer's theories, 15; mass media concepts, 163, 167; materiality of, 45; medium, as concept, 8, 219; medium is the message (McLuhan), 121, 180; military and media development, 182–4, 225–8, 250; mixed media, 163; modalities (text, images, sound), 6, 7; news production by, 173; sender/recipient mediated communications, 7, 157; social protocols, 6–7; technical forms (carriers and mediation channels), 6, 7; technologies before media, 175; time/space control, 45; time/space separations, 7. *See also* historical perspectives; media convergence; media studies
- media convergence: overview, 110, 199, 219, 253, 259–61, 272–3; blurred boundaries, 219, 260–2, 269, 272; brands and lovemarks, 260; computers as multimediation, 216, 219, 259; constantly changing content, 262; convergence of hardware and content production, 203; Darnton's ideas, 110; digital convergence, 217, 219, 253, 259–62; Jenkins as key thinker, 260; mass media, 261–2; online economy, 258, 260, 262; push- vs pull-driven mass media, 259, 261; quality of content, 259–62; remediation, 217; social media, 261–2; social processes, 253, 260–2; Sony's horizontal integration, 203; user-generated content, 260–2
- media studies: overview, 269–73; academic research, 214–16, 270; big data, 266–7; British tradition, 197, 198; communications as shapers of events, 110; device-driven development, 217–18; empirical studies, 198; ethnology, 176, 215; filter bubbles, 263–4; Frankfurt School, 196, 198; key thinkers, vii, 10; media as bodily extensions, 98, 100, 180; medium is the message (McLuhan), 180; military and media development, 182–4, 250; path dependence, 208; push- vs pull-driven mass media, 259, 261; research on mass media, 269–70; trends (21st c.), 270. *See also* historical perspectives; media; media convergence
- medieval period: overview, 61–6, 63, 65; copyists and scribes, 62, 63; information overload, 63, 64–5, 65, 280; libraries, 63–5, 65; written culture, 61

medium is the message, 21–2, 121, 180. *See also* McLuhan, Marshall

megaphones, 122, 123

Memex device, 231–2, 248, 290

memory: overview, 31, 107–11; elderly as memory banks, 25; freedom of the press, 108; impact of writing on, 50; Inca talking knots, 71–3, 72, 281; Jewish culture and historical memory, 43; oral narratives, 31; Plato's views, 50; rhythms and rhymes, 29, 34, 76; stories as human books, 29; writing as control, 40. *See also* counting aids

Menocchio and scriptural readings, 109

messengers and messages: carrier pigeons, 145, 184–5, 186; information noise, 15; intact messages, 15; intermediary positions, 15; Krämer as key thinker, 10, 15; legitimacy of postal messengers, 44, 46; material processes, 15; old/new continuities, 184–5; telegraphy's last mile problem, 145; time/space separation, 15; transmission capacity limitations, 15. *See also* acoustic telegraphy; postal systems; telegraphy

Microsoft Corporation: founding of, 238–9; Hotmail, 247; as software company, 239, 242–4, 243; Windows operating system, 240, 242–4, 243. *See also* digital media; media convergence; personal computers (PCs); personal computers (PCs), industries

Middle Ages. *See* medieval period

Middle East: Afghan war rugs, 55; Baghdad libraries, 57–9, 58, 61; cinemas, 166; clay tokens and tablets, 37–9, 38; coins, 56; early history of writing, 37–41, 41; literacy rates, 169; newspapers, 129; Silk Roads, 54–6, 61; street lights, 149. *See also* Arabic culture; Egypt; Iran; Islam

military and war. *See* Second World War; war and peace

mobility: overview, 253–8; apps, 255–6; broadband networks, 256; cloud computing, 254; convergence of internet and computers, 253–8; digital media, 216–17; genericized trademarks, 202–3; Innis as key thinker, 45; iPhones, 216, 217, 255, 255–6, 291; laptops, 217; music players, 256; user-generated content, 254, 256, 258, 260, 261. *See also* media convergence; social and streaming media

modern era, early (15th to early 19th c.): overview, 73; administration, 52; consumer culture, 112, 114; language shifts (18th–19th c.), 115; multimedia events, 79–83. *See also* Enlightenment; photography; telegraphy; telephony

modern era, late (19th c.): overview, 111–20, 173–4; analog media, 173–4; anti-modernism, 157–8; art and media, 154; assumptions of media importance, 127–9, 140; everyday life as familiar, 112, 114; language shifts, 115–16; literacy, 131; mass media, 157–8, 171–4; media-founding era, 173–4; modernist aesthetics, 154; museums, 151–2; pulp fiction, 168; statues and monuments, 127–8, 128, 285; visual culture, 150–5. *See also* analog media; newspapers; photography; print culture; progress narratives; telegraphy; telephony

money: overview, 55–6, 211–12; cheques, 212; coins as metaphor for lowbrow mass media, 168, 211–12; coins in ancient cultures, 50, 56, 154; as communication, 212; credit cards, 212, 213; durability and mobility, 55; paper banknotes, 56, 212, 213; public papers (18th c.), 8; symbolic value of coins, 55, 56, 211–12. *See also* administration; bookkeeping

Montenegro, 27, 30

Morse code, 142, 221

**motörhead**, 83

movable type, 84–6, 88, 92, 93, 139–40, 282. *See also* printing technology, early

movies. *See* film and video

Muhammad, 56, 59, 60

multimedia events: overview, 79–83, 122–5; assumptions of media importance, 127–9, 140; ball houses, 81; church services, 80; exhibitions, 134, 153, 155; French Revolution, 82–3, 110; historical sources, 155; mass meetings, 121, 122, 124–6; Nuremberg war crimes trials, 156–7, 287; old/new continuities, 82; oral narratives, 29, 32–3; political debates, 122, 124–5; printed texts, 80; public executions, 81; statue inaugurations, 127–8, 128, 285; symbiosis of media, 124; theatres and opera houses, 81; war victory celebrations, 79–80, 82. *See also* public sphere and speech

multimediality, computers as, 216, 219, 259. *See also* computers; digital media

museums: overview, 151–2; British Museum, 126, 127, 151–2; dioramas and settings, 152; newspapers and journals, 126, 127; open-air museums, 152; photography, 30, 152, 210; social access, 154; wax museums, 152. *See also* libraries and archives

music: Buddhism, 280–1; old/new continuities, 4, 176–7; religious messages, 66–7; sheet music, 176–7; silent film accompanists, 178–9; in storytelling, 29. *See also* sound recordings and playback

music industries: advertising, 177; big data, 266–7; convergence of hardware and content production, 203; copyright, 175–6; jazz, 177; as mass media, 157, 163, 177; old/new continuities, 176–7; personalization of media, 264–7, 265; radio, 177; sound recording technologies, 175, 177; Spotify, 215, 216, 246, 264–7, 265, 291; symbiosis of hardware and software, 177. *See*

- also media convergence; sound recordings and playback
- Muslims. *See* Arabic culture; Islam
- Myspace, 258
- narratives: detective stories, 159–60, 160, 162;  
*Don Quixote* (Cervantes), 102; Gilgamesh, 40–1, 278; journalists in fiction, 134; *Maqāmāh* (short stories), 58; media convergence culture, 260; pulp fiction, 159–60, 160, 168; science fiction and technology, 205, 230; *The War of the Worlds* (Wells), 188, 204, 288. *See also* authorship; copyright; oral narratives
- national identities: overview, 167; imagined communities, 75, 101, 104, 281, 283; mass media, 163, 167; oral literature, 27–9, 32; print culture, 283
- Nazi Germany: overview, 189–91; administration, 223; anti-Nazi photojournalism, 161; anti-Semitism, 189, 190, 191; ban on blackletter font, 132; ban on Western radio, 187; concentration camps, 223; eugenics, 196; film, 189–91, 190; mass media, 189–90, 196; newsreels (Ufa), 156–7, 189–90; Nuremberg trials, film evidence, 156–7, 287; propaganda, 180, 185–7, 189–91, 190, 198, 269–70; radio, 180, 185–7; reactionary modernism, 191. *See also* Second World War
- Nelson, Ted, 230
- neon lights, 149
- net. *See* internet
- Netflix, 216, 264, 266–7. *See also* social and streaming media
- Netherlands: ARRA computers, 228–9; Philips electronics industry, 199, 199; printing, 91, 100, 103
- networks: overview, 238; convergence with computers, 253–9; file sharing, 256–7, 257, 261–2; power in central nodes, 246. *See also* internet
- new media. *See* social and streaming media
- Newfoundland, underwater cables, 144
- news agencies, 136, 163
- newspapers: overview, 103–4, 125–40, 262; access, 131; advertising, 101, 130–1, 136, 138, 139–40, 151; analog and digital media, 218–22; assumptions of importance, 127–9, 140; bound as books, 96, 129; circulation, 167, 171, 173; clipping bureaus, 129, 132, 136, 145; consumer culture, 101, 151; copyright, 136, 140; correspondents, 119; domestic news, 75; early history, 75, 96, 101, 103, 126–7, 129; filter bubbles, 263–4; fonts (antikva), 132; formats, 96, 129; as historical sources, 125–9, 126, 137, 140, 155; illustrations, 130–1, 136, 140, 153; imagined communities, 75, 104; libraries and archives, 101, 126, 127; literacy rates, 131, 169; as mass media, 157, 163, 168; media convergence, 219, 261–2; as mundane, 215; nationally oriented media, 163; news agencies, 136, 163; news flow, 262; niche subjects, 130; objectivity, 136, 145; old/new continuities, 4, 103, 125, 132, 219, 263–4; paper from wood pulp, 112; penny press, 131, 159, 168; political press, 135–6, 158; press history, 134–5; print capitalism, 136, 145, 151, 167, 171; production technologies, 96, 112, 131–2, 136–40, 139; professionalization, 132, 134, 140; progress narratives, 115, 125; public sphere, 105, 107, 122, 124–5; scrapbooks, 129, 137; self-promotion, 125; social hierarchies, 104; sports journalism, 171–3; statistics, 129, 136–7, 139; subscriptions, 103–4, 136; symbiosis of media, 124; telegraphy, 145; as waste paper, 129, 135. *See also* fonts, typefaces, and typesetting; mass media; print capitalism
- Newton, Isaac, 98
- Nick Carter (fictional detective), 159–60, 160, 162
- Nietzsche, Friedrich, 207, 289
- Nigeria, 170–1
- nineteenth century. *See* modern era, late (19th c.)
- Nintendo's video games, 200, 201, 203, 204
- Nobel Prize, 11
- Noble, Safiya Umoja, 266
- Norström, Vitalis, 157–8, 159, 167–8
- Norway, 61, 75, 152. *See also* Scandinavia
- Nova Reperta* (Stradanus), 86, 87
- Nuremberg trials, film evidence, 156–7, 287
- office technologies. *See* administration and mass media
- old/new continuities: overview, 3–9, 141, 219, 259, 270–3; analog and digital media, 217–22; computerization, 259; diversity of overlaps, 5–6; dominant, emergent, and residual elements, 3, 185, 219; Marvin as key thinker, 141; remediation, 86, 216; social contexts, 141
- Olympics, 7, 172, 190–1
- Ong, Walter J. (key thinker), 31
- optical telegraphy, 140, 142, 221. *See also* telegraphy
- optical unconscious, Benjamin's, 196, 288
- oral culture: overview, 31; agreements and contracts, 29; ancient Greece and Rome, 18, 30, 42–3, 48, 49–50; authorship, 29; church pulpits, 74, 75, 80, 104, 281; conversations, 18, 76; gossip and rumours, 26, 29, 32, 76, 82–3, 110, 148; knowledge storage and transfer, 31–2, 34; medium is the message, 31; old/new continuities, 5, 74, 76, 141, 271; Ong as key thinker, 31; Peters as key thinker, 18; prehistoric times, 26–7, 32; reading aloud, 48–9, 49, 109, 111, 169, 169–70; rhetoric, 48; sensorial spectrum, 26; sermons, 75, 76, 80; sound and creation, 12–13;

- time travel, 26; tradition as valuable, 31; universities, 75–6; voice of the herald, 42–3; vs written culture, 18, 31, 49–50. *See also* languages; oral narratives; public sphere and speech; sound recordings and playback; speech
- oral narratives: overview, 26–32; audience and context, 29; blend of myths and history, 27; creation stories, 28–9; epics (*Kalevala*), 27–9, 32; Homeric memory techniques, 29, 30, 76; as multimedia events, 29, 32–3; national identities, 27–9, 32; power of words, 29; recordings of, 27, 30; recurring patterns, 26–7; rhythms and rhymes, 29, 34; social functions, 27–8; storytellers, 29; visual communications, 32–4. *See also* narratives
- Osterhammel, Jürgen, 117
- Page, Larry, 248
- paintings: Christian multimedia, 67–8; linear perspective, 68–71, 281; social hierarchies, 95. *See also* visual media
- paleolithic revolution, 32–3
- paper: overview, 60–1, 92; Arabic culture, 61; cheap paper, 93; Chinese culture, 60–1, 84, 93; counting units for paper, 35–6; cultural change, 93; money, 56, 212, 213; old/new continuities, 61; origin of paper, 60–1; paper from birch bark, 62; paper from rags, 45, 61, 112; paper size standards, 207, 210, 212; papyrus, 43, 50, 52, 61, 62; thin wood-pulp paper, 112; waste paper, 129, 135. *See also* writing materials
- parchment, 53, 61, 62–3, 84, 88
- Parikka, Jussi, 17, 276, 277
- Paris, France: exhibitions, 153, 155; media-related workers, 78, 79. *See also* France
- Parry, Milman (key thinker), 27, 30
- passports, 77, 210–11, 212, 262, 289. *See also* identification systems
- Pathé Frères industries, 167, 172, 177–9, 178
- payment. *See* money
- PCs. *See* personal computers (PCs)
- peace. *See* war and peace
- peer-to-peer (P2P) networks, 256
- Penzias, Arno, 11–12, 12
- Persian empire, 7, 43–4, 46, 48, 56–7, 59, 278
- personal computers (PCs): overview, 237–44, 249–53; big data, 266–7; Castells as key thinker, 246; as commonplace, 251; computer mouse, 230, 241; consumer market, 240–4, 241, 243; convergence with networks, 253–9; data policies, 251–2; government regulation, 240, 244; graphic icons, 241–2, 242; GUI (graphical user interface), 241–3, 242, 243; hardware, 240–1, 241; operating systems, 239–44, 243; privacy issues, 251–2; programmable devices, 239–40; search engines, 248–9, 249; significance of, 233, 244, 249; social processes, 249–53; software, 240–1, 243–4; surveillance technologies, 251–2, 266; TCP/IP protocols, 235–6, 244, 248; virtual reality, 241; web browsers, 245, 247–9, 249, 263–5, 265; World Wide Web, 244–9, 291. *See also* administration and mass media; computers; computers, historical perspectives; games; internet; media convergence; social and streaming media
- personal computers (PCs), industries: NeXT computers, 245; start-ups and culture, 230, 238–40; Xerox Alto GUI computers, 242. *See also* Apple Inc.; Google LLC; Microsoft Corporation
- Pestalozzi, Johann Heinrich, 152
- Peters, John Durham (key thinker), 8, 18
- petitions, 79, 121–2, 124, 135. *See also* public sphere
- Philip II of Spain, 77
- Philips as hardware manufacturer, 199
- phonograph. *See* sound recordings and playback
- photocopiers, 202
- photography: overview, 111–14, 262; advertising, 130–1, 138, 139, 151; aerial photography by carrier pigeons, 185, 186; albums, 112, 151; analog and digital media, 218–22, 230; anthropological research, 47, 193; calotypes, 116; camera obscura, 68–70, 69, 281; cameras, 115, 116, 117, 122, 150–1, 155–6; cultural contexts, 117; daguerreotypes, 112, 114, 115, 116, 167; digital images, 262; eugenics and scientific racism, 193–6, 194–5; explanatory texts, 118, 119; facial recognition, 266; familiar images, 112; as historical sources, 15; identification systems, 210–11, 262; illustrated press, 130–1, 161; industries, 200; as mass media, 163; media convergence, 262; military and media development, 185; objectivity and essences, 120; oldest photo, 113; old/new continuities, 262; photo booths, 211, 211; photojournalism by masses, 161; pixels, 230; posters, 151; solar writing (heliography), 112; stereoscopic photography, 119, 152, 167, 193; X-rays, 120, 155, 210, 284. *See also* film and video; images in print
- pigeons, carrier, 145, 184–5, 186
- piracy and plagiarism. *See* authorship; copyright
- Pirate Bay, file sharing, 257, 257, 261–2
- Plato, 18, 49–50, 58
- politics: art reproductions and change, 154; Enlightenment “-isms,” 116; filter bubbles, 263–4; images in print, 96–7, 97, 161; Marxist approach to networks, 246; mass media as propaganda, 160–1, 269–70; mass meetings, 120–2, 121, 124–6; multimedia events, 82–3, 122, 124–5; news flow, 262; old/new continuities, 82, 263–4; partisan newspapers, 130, 135–6, 158, 159; political spectrum, 116, 124, 130, 135–6; public

- opinion, 104, 106, 116, 121–2, 124–5; resistance and portable media, 48. *See also* government; propaganda; public sphere; public sphere and speech
- portability. *See* mobility
- positioning systems, 233–4
- postal systems: overview, 43–8, 150, 278–9; breakdowns, 48; centralized systems, 44; cultural changes, 93–4, 150; email, 235–7, 247; European history, 93–4, 103; legitimacy of messengers, 44, 46; letters, 107–8, 150; old/new continuities, 150; Persian and Roman, 43–4, 46; public sphere, 107; stamps, 59; transport systems, 44, 94, 150
- Postel, Jon, 237
- posthumanism, 205. *See also* cybernetics and artificial intelligence (AI)
- power relations: books, 95; central nodes in networks, 246; internet, 246; mass media, 196; two-way communications, 4, 141, 253, 269. *See also* colonial media; slavery; social hierarchies
- press as journalists. *See* journalism as “the press”
- press as news. *See* magazines and journals; newspapers
- press as technology. *See* printing technology, early print capitalism: overview, 100–4, 171, 283; Bible as bestseller, 100; booksellers, 101, 112; changing systems and contexts, 95; distribution, 96–7, 171; European centres, 103–4; Frankfurt Book Fair, 101; images, 96–7, 97, 102; imagined communities, 101; job printing (everyday print), 96; languages, 104; mass media, 171–2; newspapers, 101, 103, 136–7, 139–40, 139, 145, 171; piracy and plagiarism, 94, 102–3, 257; political pieces, 97–8; populism, 171; production technologies, 96–7, 136–7, 139–40, 139; propaganda in religious wars, 103; public sphere, 105, 107; subscriptions, 103–4, 136; telegraphy, 145; US dominance, 171; vernacular languages, 104. *See also* advertising; authorship; images in print; journalism as “the press”; magazines and journals; newspapers
- print culture: overview, 90–8, 110; changing systems and contexts, 92–3, 95; counterfeits, 94; credibility of information, 94–5; dissemination of knowledge, 93; Eisenstein as key thinker, 85; heterogeneity vs homogeneity, 104, 106; imagined communities, 75, 101, 104, 281, 283; interdependence with other media, 110; linguistic complications, 95; maps, 91, 98, 143; national identity, 283; old/new continuities, 91, 98, 141; progress narratives, 95; reprints, 94; shift from print to digital, 180; stability of knowledge, 90–1, 94–5, 98, 103; vernacular languages, 104, 283. *See also* authorship; books; images in print; public sphere
- printing technology, early: overview, 76–7, 83–91, 282; analog vs digital technology, 86, 282; as change agent, 84–5, 88, 90; credibility of print information, 94–5; Eisenstein as key thinker, 85; European colonization, 89–90; Gutenberg’s press, 61, 84–6, 88–91, 95; historical sources, 91; images, 88–90, 90, 96; linguistic diversity, 89; media-related workers, 78, 79, 84; movable type, 84–6, 88, 92, 93, 139–40, 282; old/new continuities, 74, 83–4, 86, 91; progress narrative, 95; rotary press, 88; stability of information, 6, 90–1, 94–5, 98, 103; statistics on books, 88; trade routes, 89–90; woodcuts (block prints), 84, 86, 90, 96, 117. *See also* paper
- privacy, 251–2, 265, 266. *See also* surveillance technologies
- progress narratives: digital infrastructure, 254; inventions, 146; media archaeology, 164; newspapers, 115, 125; print culture as foundation, 85, 95, 104, 135; visual communications, 33
- propaganda: overview, 160–1, 188–93, 269–70; agitprop (grievance exploitation), 161, 189; anti-black racism, 191–3, 192; anti-Nazi photomontages, 161; anti-Semitism, 189, 190, 191; in cigar worker factories, 169; coins in propaganda wars, 56; film, 189; individualized responses, 212–13; mass media as, 160–1, 189, 269–70; medium is the message (McLuhan), 180; Nazi radio and film, 180, 185–9, 198; origin of term, 160–1; public opinion, 160; reading aloud to workers, 169, 169–70; research on, 269–70; Soviet radio, 187, 188–9
- Protestant churches: church pulpits, 74, 75, 80, 104, 281; Counter-Reformation, 101, 103; creative readings of scripture, 109; images in print, 98; Luther, 76, 80, 82, 98, 100; multimedia events, 80, 82; printing press, 85, 90–1; public sphere, 107; reformers, 82, 98; sermons, 75, 76. *See also* Christianity
- public institutions. *See* administration and mass media
- public service broadcasters: overview, 165; absence of advertising, 165; Americanization, 162–3, 165; dubbed and subtitled media, 166–7; educational mission, 162; interwar period, 162; media convergence, 261; sports journalism, 172. *See also* media convergence; radio; television
- public sphere: overview, 104–7; audiences for science, 100, 107; clandestine communication, 108–9; Enlightenment, 106–8, 116, 119; freedom of the press, 107–8; gendered space, 51; graffiti, 51, 53, 79; Habermas as key thinker, 105;



- homogeneity vs heterogeneity, 105–7; multimedia events, 122, 124–5; newspapers and journals, 105, 107, 122, 124; old/new continuities, 121–2; petitions, 79, 121–2, 124, 135; political debate, 105, 107; postal system and letters, 107; posters, 78, 79; vs private sphere, 51, 148–9; public places, 105, 106, 107; religious ideas, 100, 107; social hierarchies, 105, 107; telegraphy, 124; women, 51, 148–9. *See also* postal systems; propaganda
- public sphere and speech: overview, 120–5; dialogue vs mass communication, 18; Exeter Hall, 121; gossip and rumours, 26, 29, 32, 76, 82–3, 110, 148; mass meetings, 120–2, 121, 124–6; newspaper coverage, 122, 124–5; overload, 121; Peters as key thinker, 18; political debates, 105, 107, 122, 124–5; print versions of speeches, 122, 124; public opinion, 105, 107, 116, 121–2, 124–5; pulpit as public announcement system, 75, 281; shift from written to oral, 122; sound quality, 121, 122, 123. *See also* oral culture; propaganda
- publishers. *See* print capitalism
- pulpits, church, 74, 75, 80, 104, 281
- punch cards, 222–5, 223, 224, 225, 228, 272. *See also* computers, historical perspectives
- Quran, 13, 57, 57, 60, 280
- racism: biased algorithms, 266; eugenics and scientific racism, 193–6, 194, 195; racialized algorithms, 266; US anti-black racism, 191–3, 192
- radar technology, 184, 227
- radio: overview, 185–9, 187; advertising, 165, 188, 214; amateur radio, 187; Americanization of, 163; analog and digital media, 218–22; in art, 183; BBC broadcasts, 163, 187; censorship, 185, 187, 187–9; colonial administration, 170; as commonplace, 214, 251; DJ culture, 214; film links to, 188; idealism, 182; imagined communities, 75; Marconi's wireless telegraphy, 182; Marvin as key thinker, 141; as mass media, 157, 163, 182–9; military and media development, 182–5; Nazi propaganda, 180, 185–7; non-Western chronology, 170–1; old/new continuities, 4–5, 141, 149, 184–5, 188, 214, 219, 263–4; “pirates” outside national boundaries, 188; propaganda, 188–9; sports journalism, 172; as telecommunications, 233–4; transistor radios, 201; two-way radios, 187; *The War of the Worlds*, 188, 288; in wartime, 185, 187, 187. *See also* media convergence
- radioactivity and time spans, 14
- rare-earth metals, 17
- readers and reading: overview, 109–10; aids and guides, 64–5; ancient cultures, 48–9, 49; control of interpretations, 109; devotional reading models, 70; old/new continuities, 169–70; readers for hire, 79; reading aloud vs silent reading, 48–9, 49, 109, 111, 169–70, 169; reading in ritual context, 43; shifts in trends, 48–9, 49, 109, 111; web-related styles, 109; women's reading, 70, 111, 129, 279. *See also* libraries and archives; literacy; mass media; writing
- recordings of images. *See* film and video; images in print; photography; video recordings and playback
- recordings of sound. *See* sound recordings and playback
- recursion, defined, 26
- Reformation. *See* Christianity; Protestant churches
- Reith, John, 163, 165
- religion and spirituality: overview, 9, 66, 271; abstract ideas in written culture, 31, 39–40; acoustic communications, 66–7; beads as counting aids, 36; bookkeeping systems, 39, 42; calendars, 60; competitiveness, 66–7; dialogue vs mass communication, 18; God as invisible power, 39–40; old/new continuities, 271; origin of world and sound, 12–13; power of words, 29; public sphere, 107; shamanism, 33–4, 278; speech and creation, 12–13, 29; visual communications, 66–7. *See also* Buddhism; Christianity; Islam; Judaism
- remediation: analog and digital media, 216; Benjamin's repercussion, 154; convergence of content, 217; digital media development (1990s onward), 216; as old/new continuities, 86, 216; as symbiosis, 216
- Renaissance: Arabic culture, 89; camera obscura, 68–70, 69, 281; learned culture, 65–6; linear perspective, 68–71, 281; literacy, 65–6; paintings, 70, 70; printing press, 85, 90–1; social hierarchies, 65
- research. *See* media studies
- Reuter, Paul Julius, 145
- Riefenstahl, Leni, 190–1
- rights, human, 107–11
- robots, 21, 22, 205
- rock art, 33–4, 277–8
- Roman Catholic Church. *See* Catholic Church
- Roman culture. *See* ancient Greek and Roman culture
- rugs, 55
- Russia. *See* Soviet Union
- Sappho, 49
- satellites, 11–12, 12, 233, 235
- Scandinavia: beacon system, 140, 142; blackletter fonts, 132; computerization, 250–3; open-air museum in Oslo, 152; optical telegraphy, 140, 142; parchment for treaties, 61; public service

- broadcasting, 165; runes, 62; treaty (1397), 61; university system, 75; Viking trade routes, 54, 56. *See also* Denmark; Finland; Sweden
- Scarlin, Algot, 126–7
- Schein, Harry, 234–5, 290
- Schmandt-Besserat, Denise, 38, 278
- Schmidt, Eric, 247
- sciences: overview, 9, 94, 98–100; anatomy, 97; audiences for, 100; biomedica, 19–22; credibility of print information, 94–5; evolution of species, 14; geomedica, 13–19; heliocentric world view, 98; images in print, 96–7, 97, 99; knowledge production, 94; museums, 152; old/new continuities, 98; origin of universe, 11–12, 12; printing press, 85, 90–1; public sphere, 100, 107; Scientific Revolution, 85, 90–1, 98–100; stability of print knowledge, 6, 94–5, 98, 103; zoos, 152. *See also* astronomy; earth sciences
- scribes. *See* manuscripts, copyists and scribes
- scrolls, 53, 63, 67
- seals for authorization, 61
- Second World War: aerial photography, 185, 186; carrier pigeons, 145, 184–5, 186; codebreaking, 184, 226–7, 227; film, 189; military and media development, 182–4, 225–8, 227; newsreels, 156–7, 189–90; radio, 185, 187, 187. *See also* Nazi Germany; war and peace
- Seneca, 51, 109, 206
- sensory systems: animals, 20–1; media as extensions of senses, 98, 100, 180; oral vs written culture, 18, 26, 31, 49–50; senses as noise filters, 21; spectrum, 26. *See also* sound
- Serbia, 3, 5, 27, 30
- sex. *See* gender/sex
- shamanism, 33–4, 278. *See also* religion and spirituality
- Shannon, Claude, 11, 20, 205, 221, 225, 235
- shorthand, 206. *See also* administration and mass media
- silicon, 13–14, 17
- Silk Roads, 54–6, 61
- Simmel, Georg, 212
- slavery: abolitionist movement, 124–5, 132, 133; administration of slave trade, 77, 281; ancient Greece and Rome, 49, 50, 206; newspapers and journals, 132, 133
- social and streaming media: overview, 254, 256, 258–9, 271–3; advertising, 262; archives, 258, 264; big data, 266–7; constantly changing content, 262; Facebook, 254, 256, 258, 261–4, 267, 270; filter bubbles, 263–4; idealism, 182; influencers, 270; Instagram, 258, 261, 263, 270; mass media, 261; media convergence, 261–2; mobile devices, 256, 264; news flow, 262; old/new continuities, 271–2; online economy, 258, 260; personalization of content, 263–7, 265; quality of content, 259–62; sharing of information, 261; streaming media, 219, 254, 258–9, 264, 267, 291; as term, 9; TikTok, 261, 266; Twitter, 83, 164, 258, 259, 262, 263, 270; two-way communications, 4, 141, 253, 269; user-generated content, 254, 256, 258, 260, 261; Web 2.0, 258, 261; YouTube, 4, 253, 256, 258, 264, 270, 291. *See also* media convergence
- social hierarchies: overview, 110; books as symbols, 95; bourgeoisie, 105; communications as shapers of events, 110, 141; electric media, 141; feminization of office work, 209, 210, 224, 250; literacy, 65, 141; Marvin as key thinker, 141; mass media as a threat to elites, 157–9, 162–3, 167–8; multimedia phenomenon, 82–3; newspapers, 104; permeable boundaries, 110; public sphere, 105; two-way communications, 4, 141, 253, 269; working class, 78, 79, 158. *See also* slavery
- Sony (media company), 201–4, 202, 217, 289
- sound: amplification, 42–3, 122, 123; animal senses, 21, 23–4; Big Bang as origin of universe, 11–12, 12, 14; hearing on sensorial spectrum, 26; medieval media, 66–71; religious media, 12–13, 66–7; in telecommunications, 233–4. *See also* acoustic telegraphy
- sound recordings and playback: overview, 174–7; analog and digital media, 218–22; anthropological studies, 27, 30, 47, 176, 193; cassette recorder and radio (Walkman), 201–2, 202, 204, 217, 289; cassette recorders, 199, 199, 201–2, 257; CDs and DVDs, 201, 203; convergence of hardware and content production, 203; gramophones, 174–5, 183, 184; iPods and podcasting, 203, 256, 271; late modern era (19th c.), 111; Marvin as a key thinker, 141; as mass media, 141, 157, 163, 173–4, 221–2; media-specific condition of documentation, 176; oldest recording of a human voice, 175; old/new continuities, 141, 219, 271; Parry as key thinker, 30; phonographs, 174–5; phonographs and cylinders, 47, 141, 167, 174–5, 176, 218, 221; playback, 175; sound film, 166; vinyl records, 163, 199, 221–2. *See also* media convergence; music; music industries; social and streaming media
- Sousa, John Philip, 175–6
- South Africa, tally sticks, 35, 36
- South America: early history, 37; Inca empire, 71–3, 72, 281; newspapers, 129; telenovelas, 3, 275
- Soviet Union: aerial photography by carrier pigeons, 185, 186; Afghan war rugs, 55; censorship, 187, 188–9; Communist agitprop, 161; dubbed and subtitled media, 166–7; film, 154,

189, 191; literacy, 189; propaganda, 188–9; radio, 185, 187, 188–9

*Space Invaders* (video game), 203–4, 204

Spain, slave trade, 77, 281

spectacles, 149–50

speech: overview, 22–6; agreement on meanings, 24; amplification of speech, 42–3; anatomical functions, 23, 25; early history, 32; evolution of language, 21–5; face-to-face communication, 22; genes, 25; gesture- vs speech-first hypothesis, 24; history of development, 23; origin of language, 23–5; reading aloud, 48–9, 49, 109, 111, 169–70, 169; sign language, 24; symbolic, 23–6; voice as technology, 22–3; voice of the herald, 42–3. *See also* languages; oral culture; oral narratives; public sphere and speech spirituality. *See* religion and spirituality

sports: journalism, 171–3; old/new continuities, 264, 270; Olympics, 7, 172, 190–1; remediation, 216

Spotify, 215, 216, 246, 264–7, 265, 291

stamps, postage, 59

Stanley, Henry Morton, 134

statues and monuments, 41–3, 66, 127–8, 128

stereoscopic photographs, 119, 152, 167, 193

Stockholm: beacon system, 140; churches, 74, 79; exhibitions, 134, 155, 287; film industry, 74; first daguerreotype (1846), 114; Great Ball House, 81; international journalist congresses, 134, 149–50; Narva celebrations (1701), 79–80, 82; Nordic Museum, 30; Olympics (1912), 172; open-air museums, 152; punch cards in markets, 225; telephone tower (1890), 147. *See also* Sweden

storage of knowledge. *See* knowledge storage; libraries and archives; memory; sound recordings and playback; video recordings and playback

stories. *See* narratives; oral narratives

Stradanus, Johannes, 86, 87

streaming media. *See* social and streaming media

street lights, 149

Strindberg, August, 134

success narratives. *See* progress narratives

surveillance technologies: ancient empires, 40, 44, 71; big data, 266–7; computerization, 251–2, 266; web archives, 264–5, 265

Swaziland, tally sticks, 35, 36

Sweden: overview, 10; anti-modernism, 159–60; beacon system, 140; Bergman's *Winter Light*, 74; cable TV, 234–5; censorship, 108, 162; church services, 74, 74–5, 80; computerization, 250–3; computers, 229; Conversation Square, 76; eugenics and scientific racism, 193–6, 194–5; file sharing (P2P), 257, 257, 261–2; filmmaking, 123; freedom of the press, 107–8; information management, 207; international journalist congresses, 134, 149–50; internet history, 233; labour movement, 161–2; late Middle Ages, 64; libraries, 64; magazines, 173; mass media, 157–60, 161–2, 168, 172–3; military and media development, 250; multimedia festivals, 79–80; Narva celebrations (1701), 79–80, 82; newspapers, 173; passports, 210–11; photography, 118, 119, 210–11; political press, 159; polls on media use, 214–15; public announcement system, 75; public service broadcasting, 172; public square, 120, 124; pulpit, 74, 75, 80, 104, 281; punch cards, 225; racial biology, 193–4; radio, 182, 214; sports journalism, 172; statues and monuments, 127, 285; switchboard operators, 148; telecommunications, 147, 148; television, 214; theatre venues, 81. *See also* Scandinavia; Stockholm

Syria: clay tokens, 37–9, 38

tablets, clay. *See* writing materials

tablets as digital devices, 216–17

talking. *See* speech

talking knots, Inca, 71–3, 72, 281

tally sticks, 35, 36

taxes. *See* administration; bookkeeping

telecommunications: networks, 233–4, 235; noise, 46–7. *See also* radio; telegraphy; telephony; television

telegraphy: overview, 140–7, 150; analog and digital media, 218–19, 221; cables, 142, 147; colonial administration, 170; electric telegraphy, 221; idealism, 182; last mile problem, 145; map of networks (1901), 143; Marconi's wireless telegraphy, 182; Marvin as a key thinker, 141; Morse code, 142, 221; news agencies, 136, 163; newspapers, 145–7; old/new continuities, 141, 143–4, 150; optical telegraphs, 140, 142, 221; receiving and sending, 142; speed of electricity, 142–3, 145; as telecommunications, 233–4; underwater cables, 142, 143, 144, 145–6; unreliability, 145–6; US networks, 142, 143; Western Union, 147; women, 148–9. *See also* acoustic telegraphy

telenovelas (TV soap operas), 3

telephony: overview, 141, 143, 146–9, 150; analog and digital media, 218–19, 234; computerization, 251–3; idealism, 182; internet, 149; iPhones, 216, 217, 255–6, 255, 291; Marvin as key thinker, 141; as mass medium, 149; modems for networks, 234; news agencies, 136, 163; news and entertainment, 149; old/new continuities, 141, 143–4, 146–7, 149–50; in Sweden, 147, 148; switchboard operators, 148, 148–9; as telecommunications, 233–4; underground cables, 147; women, 148, 148–9. *See also* mobility

television: overview, 214; advertising, 165, 197; analog and digital media, 218–22; audiences, 269–70; BBC as model, 163; Berlin Olympics (1936), 7, 190–1; cable TV, 233–5; comparative research on US and UK, 197; convergence on optical fibre cables, 269; criticism of, 197–9; dubbed and subtitled media, 166–7; flow of images, 197; as furniture, 214; idealism, 182; imagined communities, 75; as mass media, 157, 163, 269; military and media development, 182–4; non-Western chronology, 170–1; old/new continuities, 4–5, 214, 263–4; remediation, 216; social protocols, 7; sports journalism, 7, 172–3, 190–1; statistics on ownership, 198; as telecommunications, 233–4; Williams as key thinker, 197. *See also* media convergence; public service broadcasters; social and streaming media text, as term, 54

textiles. *See* fabric and textiles

theatres: amplification of sound, 42–3; consumer culture, 101; kabuki theatre, 117; as multimedia events, 81

theorists, media (key thinkers), vii, 10. *See also* media studies

TikTok, 261, 266

time: Anthropocene, 17; calendars, 36, 41, 60; deep time, 16–17, 22; film as time axis manipulation, 156; radioactivity and time spans, 14

trade and trade routes: European colonization, 89–90; linguistic diversity of printing, 89; Silk Roads, 54–6, 61, 279–80, 281; slave trade, 77, 281. *See also* administration; bookkeeping; money

trademarks, genericized, 202–3

translations, 57–8, 60–1, 64, 103–4, 166–7. *See also* languages

trials. *See* law and legal systems

Turing, Alan, 183–4, 225–7, 232, 290

TV. *See* television

twentieth and twenty-first centuries. *See* analog media; computers; digital media; film and video; mass media; media convergence; personal computers (PCs); social and streaming media; television

Twitter, 83, 164, 258, 259, 262, 263, 270. *See also* social and streaming media

two-way communications, 4, 141, 253, 269

typewriters, 206, 207–10, 244, 247, 289. *See also* administration and mass media

United Kingdom: Americanization of media, 163, 165; BBC (public service broadcasting), 162–3, 165, 187, 189, 197, 261; big data, 265, 266–7; British Museum, 126, 127, 151–2; codebreaking in wartime, 182, 184, 226–7, 227; computer development, 222, 225–8, 230; Crystal Palace exhibition, 153; English Civil War, 107; Exeter Hall, 120, 121; film censorship, 162; first photographic printing firm, 116; illustrated newspapers and journals, 131; London Zoo, 152–3; Madame Tussauds wax museum, 152; magazines, 173; mass media, 162–3, 168, 173; military and media development, 182–4, 225–8; news agencies, 136; newspapers, 105, 124, 129, 139, 167; personalization of media, 265, 265–7; press history, 134–5; printing centre, 103–4; public sphere, 105, 106, 107, 120, 121; punch card weaving looms, 222, 272; sports journalism, 171–3; street lights, 149; surveillance technologies, 251–2, 266; telegraphy networks, 142, 143, 144, 145–6

United States: amusement parks, 153; anti-black racism, 191–3, 192; AT&T, 147–8; Big Bang research, 11–12, 12, 14; big data, 266–7; cable TV, 233–5; computer development, 224, 225–33, 227, 229; computerization, 250–3; dubbed and subtitled media, 166–7; film censorship, 162; global mass media dominance, 159–63, 160, 166–7, 178–82, 179; Hollywood film industry, 160, 166, 177–82, 188, 191, 196, 198–9; IBM industries, 217, 224, 229, 229–30, 232; information management, 207; inventions, 146; literacy rates, 168–9; magazines, 173, 174; mass media, 159–63, 160, 171–3, 174; media convergence, 261–2; military and media development, 182–4, 225–8, 227, 232, 250; museums, 152; music industries, 177; Native Americans, 176; news agencies, 136; newspapers and journals, 129, 131–2, 131, 133, 159, 167, 171–3; old/new continuities, 150; penny press, 131, 159, 168; photo booths, 211, 211; photography (19th c.), 119; progress (19th c.), 146; public papers (18th c.), 8; public service broadcasting, 261; public sphere, 107, 131–2, 131; radio, 188; reading aloud in factories, 169, 169–70; scrapbooks, 129, 137; sound recordings, 176; sports journalism, 171–3; telegraphy networks, 142, 143, 145–7; telephones, 147–8; television, 197–8. *See also* media convergence; personal computers (PCs); industries

universe, history of, 14–19

universities, 75–6

user-generated content, 254, 256, 258, 260, 261

USSR. *See* Soviet Union

Venice, 54, 81, 88, 89, 103, 168

vernacular languages, 65, 76, 100, 104, 283

Vesalius, Andreas: *De humani corporis*, 97

video and film. *See* film and video

video games. *See* games

- video recordings and playback: DVDs, 201; as mass media, 157, 163; user-generated content, 254, 256, 258, 260, 261; VHS vs Betamax (videotape format war), 201; YouTube, 258. *See also* film and video; social and streaming media
- Vikings, 54, 56
- Virilio, Paul, 182–3
- visiting cards (cartomania), 96, 112, 150–1
- Vismann, Cornelia (key thinker), 52
- visual media: overview, 32–6, 67–8, 150–5; animal motifs, 33; audiences, 269–70; camera obscura, 68–70, 69, 281; cave paintings, 33; Christian images, 67–8; clay pots, 42; dreams, 68; entertainment, 152–3; historical diversity, 33; human motifs, 33, 42; for instruction, 152; linear perspective, 68–71, 281; magic lantern shows, 111, 152, 269–70; medieval media, 66–71; motifs and patterns, 33, 42; museums, 152; old/new continuities, 74; paleolithic revolution, 32–3; rock art, 33–4, 277–8; sequential scenes, 42, 67; shamanism, 33–4; shared understandings, 34; statues and monuments, 41–3, 66, 127–8, 128. *See also* art and media; counting aids; film and video; images in print; photography; writing
- Voltaire, 103
- von Neumann, John, 228, 231, 239
- voting rights, 121, 158
- Walkman (recorder and radio), 201–4, 202, 217, 289
- war and peace: Afghan war rugs, 55; Battle of New Orleans (1815), 144; carrier pigeons, 145, 184–5, 186; censorship, 185, 187, 187–9; codebreaking, 182, 184, 226–7, 227; Cold War, 233, 269; First World War, 144–5, 182–3; interdependence of war and media, 182–3; media phases, 183; military administration, 39, 206; military and media development, 182–4, 225–8, 227, 233, 250; multimedia victory celebrations, 79–80, 82; old/new continuities, 184–5; peace, 124–5, 144, 155; radio, 182–3, 185, 187, 187–9; signal intelligence, 182; telegraphy, 140, 142, 144–5. *See also* Nazi Germany; Second World War
- War of the Worlds, The* (Welles), 188, 204, 288
- Web 2.0, 258, 261. *See also* internet
- Weber, Max, 168, 287
- Welles, Orson, 181, 182, 188, 288
- Western Union, 147
- Wiener, Norbert, 20
- Williams, Raymond (key thinker), 3, 8–9, 197, 198
- Wilson, Robert, 11–12, 12
- Winner, Langdon, 251
- wires. *See* cables and wires
- women: authors, 51; computer development, 222, 224, 226–7, 227; fabric and textile producers, 54; journalists, 134; magazines for, 173, 174; private vs public sphere, 51, 148–9; Sappho and desire, 49; telecommunications, 148, 148–9; voting rights, 121, 158; women's reading, 70, 111, 129, 279. *See also* gender/sex
- woodcuts (block printing), 84, 86, 90, 96, 117
- World Wars, First and Second. *See* First World War; Second World War
- World Wide Web, 244–9, 291. *See also* internet
- Wozniak, Steve, 238
- writing: overview, 31, 37–40; abstract ideas in written culture, 31, 39–40; administration, 40; ancient Greece and Rome, 48–53; bookkeeping as pre-history, 37–40; clay tokens, 38, 39–40, 42, 55; early history, 37–40, 41, 278; handwriting, 5, 63, 83, 132; hieroglyphs, 39, 41, 71; impact on memory, 50; knowledge transfer in time and space, 37; medium is the message, 31; oldest story, 40–1, 278; old/new continuities, 5, 61, 62, 74, 141; Ong as a key thinker, 31; vs oral culture, 18, 31, 49–50; original versions and copies, 29; pictograms, 39; replacement for other communications, 62. *See also* administration; authorship; empires; manuscripts
- writing materials: overview, 40–3, 45, 50, 62; animal skins, 62; birch bark, 62; clay tablets, 37–43, 45; durability, 45; overview, 61–2; papyrus, 43, 50, 52, 61, 62; parchment from animal skins, 53, 61, 62–3, 84, 88; stones, 40–3, 45; textiles, 43, 54; wax tablets, 43, 63; wood, 43; writing tools, 62. *See also* paper
- Xerox Corporation, 202, 241–2, 242, 290–1
- X-ray photography, 120, 155, 210, 284
- xylography, 130
- Yates, JoAnne, 207
- YouTube, 4, 253, 256, 258, 264, 270, 291. *See also* social and streaming media
- Zielinski, Siegfried, 16–17, 22
- Zola, Émile, 103
- zoological gardens, 152
- Zuse, Konrad, 226