



A  
MATTER  
of  
FACTS

The Value of Evidence in an Information Age

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*Foreword by Lee McIntyre*



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# Series Introduction

**“WHAT’S PAST IS PROLOGUE”**: IN *THE TEMPEST*, SHAKESPEARE REMINDS us that our actions up to this very moment provide context for our present decisions and actions. The accrual of this activity, in the form of the archival record, enables us to reflect on that past with tangible evidence in hand (or on screen). But recorded evidence doesn’t just enable us to interrogate the present. We preserve the records and data of the present to provide evidence and context that will help us shape our collective future.

The Archival Futures series seeks to capture an irony that lies at the heart of the series title: Can what is past have a future, and vice versa? As a point of departure for critical thinking and for conversation, it centers the active role of archivists *and* all citizens in documenting society. Above all, it seeks to bring together all individuals who have a vested interest in cultural heritage and its stewardship, to both acknowledge and imagine the importance of the future archival record. This is a tall order.

When citizens find themselves without records and archives, memory, accountability, and transparency become precarious. We all share a collective, vested interest in the future of archives and must be partners in the preservation of the evidence of our present. Archivists act on behalf of the public good. Our work is focused outward and reflects the interests of many individuals and institutions. When archivists appraise records for enduring archival value, we imagine how people will use those materials; when archivists arrange and describe those records, we imagine how those descriptions might help people access important records; when archivists select technology and systems to serve as interfaces to our inventories and digital materials, we consider the

ease with which people can find critical information; when archivists preserve and provide access to records, we imagine how those records will provide context for complex issues to society in the future; and when archivists consider the constellation of digital content on the Web—social media, hosted systems, local systems—and the fragility and ephemeral nature of that content, we understand our vital roles as stewards for the historical record, and our role in ensuring that these materials will exist in the future.

What makes this engagement of the archival record possible is a new approach to looking at the archival endeavor. By considering the work of archivists along with the theory that underpins that work, and by pairing that with ideas from contemporary trends in social theory, this series shows how the preservation and stewardship of the archival record is a collective effort that underpins and supports democratic societies and institutions. Our current times stand as a watershed for transparency, authenticity, accountability, and representation. These values are bound to the responsible preservation of our historical materials, and everyone should be concerned with the processes by which we accomplish this.

The decision to preserve a historical record is also undertaken in conjunction with allied professionals, such as librarians, museum curators, and information scientists, and is fundamentally future oriented. As the contributions to this series reveal, the notion of an *archival future* underlies all discussions concerning the responsibility to promote the preservation of records that document the full range of human activity. Archival practice necessarily responds to the past, the present, and the future. Archival professionals imagine a future—whether in the next century or a week from now—and strive to support the use of records in that future, by people not yet known, for reasons not yet imagined.

Through the contributions to this series, we want to open the discussion about the future of the archival record. We enter into this with the understanding that the archival record of the past informs contemporary society and that archival practice is a collaborative endeavor—between archivists, librarians, and citizens. Our stake in the future is written in the records and archives that represent us and tell our stories to future generations. What is past is not simply prologue; what is present is not simply epilogue; the records of the now are vital to the future of human society.

*Bethany Anderson*  
*Amy Cooper Cary*

# Foreword

**EVER SINCE BOYHOOD, ONE OF MY FAVORITE THINGS TO READ HAS** been dystopian fiction.

I'm not sure why it's always appealed to me. I don't like to read about space travel or weird life forms on other planets. But alternative views of what life on Earth might look like (what is sometimes called "social science fiction") have always captured my imagination. When I look back on the books that have really gripped me, I realize they were novels like George Orwell's *Nineteen Eighty-Four*, Aldous Huxley's *Brave New World*, Ray Bradbury's *Fahrenheit 451*, and in more recent years Margaret Atwood's modern classic *The Handmaid's Tale*.

Why these particular books? What is the attraction?

In addition to the horror of what happens to human beings in these novels, something that has always terrified me is the prospect of a world in which reality and truth are also under assault. Where human beings live in a world where they are made to feel crazy for wanting to float above the bullshit.

In *Nineteen Eighty-Four*, Winston Smith works in the Ministry of Truth as a censor. One day, when he finds incontrovertible proof that something has happened—which his government said did not happen—he holds it in his hands for a few seconds, before slipping it into the "memory hole" where it is lost forever. Orwell writes,

[T]his was concrete evidence; it was a fragment of the abolished past, like a fossil bone which turns up in the wrong stratum and destroys a geological theory. It was enough to blow the Party to atoms, if in some way it could have been published to the world and its significance made known.

This is scary stuff. But then comes the really chilling part, which is when Winston asks himself the deeper philosophical question: What difference does it make whether such evidence once existed, if it does not still exist, and if the Party holds absolute power over present reality? Orwell continues,

It was curious that the fact of having held it in his fingers seemed to him to make a difference even now, when the photograph itself, as well as the event it recorded, was only memory. Was the Party's hold upon the past less strong, he wondered, because a piece of evidence which existed no longer HAD ONCE existed? But today, supposing that it could be somehow resurrected from its ashes, the photograph might not even be evidence. . . . The past not only changed, but changed continuously. What most afflicted him with the sense of nightmare was that he had never clearly understood why the huge imposture was undertaken. The immediate advantages of falsifying the past were obvious, but the ultimate motive was mysterious.

The goal, of course, as Winston learns later in the book, is the achievement of power.

In *Brave New World*, books exist, but they are either suppressed or ignored. There are rumors of old forbidden books locked in a safe somewhere. But all books published before a certain date are prohibited. One character proudly proclaims that all of the books in libraries these days are books of reference, on the theory that if young people need a distraction they can get it at the “feelies.” In *Brave New World*, entertainment comes from screens and sex and soma. A single copy of Shakespeare lies filthy and vermin-bitten, abandoned on the floor.

In *Fahrenheit 451*, the assault on evidence is even more overt, as books are burned as a means of controlling human behavior. In *The Handmaid's Tale*, women are not allowed to learn how to read.

Fast-forward to our present day, and we hear stories of the final days of the Obama administration, when people in the EPA and NASA were madly copying and disseminating documents to far-flung locations, guarding against the day when the Trump administration would come to power and perhaps decide to destroy the evidence about climate change. Even as I write this, the top news story on cable TV is one of censorship, where a political appointee of the president has full charge over redacting a 400-plus-page document that purports to tell the truth about whether a foreign power engaged in a cyber attack on our 2016 presidential election.

The control, fabrication, alteration, and destruction of evidence are no longer a thing of dystopian fiction. It is our present reality.

As Laura Millar writes in the preface to her quietly monumental book *A Matter of Facts*, it is her goal to stand up not just for facts but for evidence. What is the difference? For anyone who cares about truth, it is crucial.

In a digital age, the threat to reality is not just political but also technological. Imagine the tools of censorship in the hands of a 21st-century autocrat. In the past, authoritarian governments destroyed paper records (and sometimes the people who created them). Today, much of the evidence that serves as proof of historical and scientific facts exists only on computer servers and can be deleted at a keystroke. Orwell's question comes back to haunt us: If we cannot prove that something happened, did it really?

Ever since the 2016 election, there has been a push for archival protection under the threat of disappearance, against fading memory and political manipulation, of attacks on the truth-tellers in journalism and academics, even in law enforcement. Amy Siskind has been at the tip of the spear in guarding against this with her simply conceived book *The List*, in which she records—on paper—a list of changes made under the Trump administration, so that we will never forget what actually happened. In an interview, Siskind once commented on the reason that she finally relented and turned her digital blog into a physical book. At first she resisted but then one day realized that there was an advantage to having her list exist not just in virtual but also in paper form.

Must evidence be physical? No. But without a physical backup (and sometimes even with one), there is always the possibility of malfeasance. It is harder with a physical record. Electronic voting records can be compared to paper ballots. Digitally altered photographs can be compared to their originals. Text and audio can be scoured for evidence of manipulation.

The possibility of fakes will always exist, but without the presence of evidence, how will we know how to detect them? Millar has written a book of the utmost importance for those of us who care about the assault on facts, truth, evidence, and the values that uphold them. In this post-truth era, there are books aplenty that provide the historical context for what we are facing (Tim Snyder's *On Tyranny*), that trace out the lines of conceptual symmetry (Jason Stanley's *How Fascism Works*), and some that provide a philosophical defense of truth and evidence as well. But there are precious few that tell us what we can do right now to protect ourselves and our rights—other than voting and protesting—while we are living through this dangerous time.

Laura Millar's book does this, and brilliantly so. Though she demurs at one point and says that philosophy is "above my pay grade," I found much to learn from her careful dissection of the differences between data, information, evidence, facts, truth, and proof. But this is more than just a book of argument—or politics—for here we find fluid readable prose that tells a compelling story.

*A Matter of Facts* is (unfortunately) not a work of fiction; the threat of dystopian reality has now migrated from the world of make-believe to the one we actually inhabit. But never fear because you now hold in your hands one of the texts that will help you to make sense of this world. Like Orwell and Bradbury, like Stanley and Siskind, Laura Millar has written a book that people in the future will look back on and say, “This is one of the books that helped us to survive until a new era.”

*Lee McIntyre*  
*April 2019*

# Preface

**I AM A DIGITAL IMMIGRANT. WHEN I WAS A CHILD, THE ONLY TELEPHONE** in our home was a black rotary dial model that sat on the hall table. By the time I was a teenager, we had a second phone. It had a cord long enough that I could sit on the staircase and imagine I was having a private conversation with my best friend, even though my mother always seemed to have something essential to do just within earshot. When I bought my first personal computer in 1984, the machine, keyboard, 10 megabyte hard drive, and dot matrix printer (along with an ink cartridge and a pack of bond paper) cost me over \$5,000. Today, I cannot escape technology. My husband and I own two desktop computers, four laptops, three iPhones, three iPads, and a digital photograph album. We are living, breathing examples of the transition society is making from analog to digital.

I have worked as a recordkeeping consultant for nearly 35 years. I have helped governments establish policies to manage digital evidence, and I have rescued boxes of deteriorating paper files from flooded basements. I have consulted with national and state governments in Canada, the United States, Fiji, Sri Lanka, Trinidad, Hong Kong, and Zambia. I have sorted archival photographs with retired volunteers in local historical societies, helped First Nations governments in the Canadian Arctic preserve oral histories and traditional stories, and provided advice on electronic records management to international agencies like the United Nations. Through my career, my recordkeeping goals have been the same: to protect trustworthy sources of evidence so that agencies remain accountable; people's rights are protected; organizations can uphold

their responsibilities; and communities have access to the documentary touchstones that allow them to shape identities and share memories.

I have written this book because I see a crisis before us. An evidence crisis. I want to convince you that evidence—which is different from data, information, or facts—is critical to accountability, identity, and memory, and ultimately to democracy. If we are going to survive these perilous times for the world—and they are perilous—we need evidence. We need access to government reports that demonstrate whether public officials are fulfilling their promises; to property documents that prove we own our land; to birth certificates that verify our citizenship or trace our lineage; and to archival photographs that help us recollect past times. Because so many of these sources of evidence are now digital, we cannot just assume they are going to survive as trustworthy sources of proof. We all must look differently at how we capture, preserve, share, and protect our sources of evidence. Otherwise we may not be able to access these critical sources of proof when we need them.

I have written this book for the public, not for my professional colleagues. I draw on news events rather than scholarly treatises. I tell stories rather than analyze theories. I am taking a risk here, of course: writing for my peers has become a (relatively) comfortable place to be. Explaining contemporary record-keeping issues to the public, on the other hand, is a tricky business, especially in today's fraught and fast-moving political climate, when the news keeps changing day by day. The stories I recount here will probably have changed by the time this book is in print; new sources of evidence will challenge existing interpretations. But that's the whole point of evidence. The more we have, the better our understanding. Which is why we need evidence so badly. And the more we have, the better our ability to assess the truth. Evidence-based truth, not personal truth.

In this book, I am calling on you, the public, to join us, the recordkeepers, to become the “we” in “we must work together to protect evidence in the digital age.” So even though I sometimes refer to my own professional group of recordkeepers as “we” and “us,” more often I am referring to all of us: you, me, our families, our workmates, our fellow colleagues, or our classmates. Everyone. We need to come together to create a new movement. An evidence movement. We need a call to arms for the protection of authentic evidence. I hope that by the time you finish this book you will join me in this quest for change. We can and must work together to protect evidence as a trustworthy foundation of a just and democratic society.

# Introduction

*A wise man, therefore, proportions his belief to the evidence.*

David Hume, 1777

**THE CAREER TRAJECTORY OF ARCHIVISTS LIKE ME, WHO STARTED IN** a predigital world, is not what we expected. After receiving my graduate degree in archival studies in 1984, my first job was to help a local historical society organize its archival photographs and old diaries. I worked out of the basement of a local school and spent a lot of my day drinking tea and listening to the volunteers, all in their seventies and eighties, reminisce about the adventures of their teenage years. Some three decades later, I spend my days writing electronic records management and digital privacy policies; advising on the costs, risks, and benefits of digitization as a tool for preservation and access; and recommending procedures for separating important email communications from the thousands of duplicates cluttering corporate records systems.

When I say I am trained as an archivist, though, many people look puzzled. Either they don't know what an archivist is, or they assume I am a librarian or historian. I am not a librarian; I can't develop a collections policy or catalog a book. I am not a historian, though like all archivists I am quite competent at historical research—it's a fundamental part of the job. Some people think that I trace family trees for a living, like the researchers on *Who Do You Think You Are?*, or that I appraise artifacts, like the experts on *Antiques Roadshow*. No and no. At the furthest edges of misunderstanding, some people see me as a real-life Indiana Jones and assume that I go on expeditions to find lost treasures. I consider archives treasures, but I don't crawl through snake-infested jungles to find them. (Heaven forbid.) One devotee of Stieg Larsson's thriller *The Girl with the Dragon Tattoo* compared me with the cyberpunk computer hacker Lisbeth

Salander. That confusion was quickly corrected. I am decades older and entirely tattoo free.

Yes, archivists work with historical resources and publications and databases. We preserve photographs so that the village can create displays for its 100th anniversary. We photocopy newspaper clippings so that the local historian can find references to the Great Flood of 1948. We digitize old documents so that undergraduates can study the Stock Market Crash of 1929. We develop digital recordkeeping systems so that government officials can find contracts and correspondence quickly. We are trained to find logic and order in a pile of boxes or a cluttered shared drive. Creating order out of chaos is one of our great strengths.

But we are not “just” archivists. We *are* archivists. We are recordkeeping professionals; evidence keepers; protectors of proof. Our goal is to preserve documentary evidence not only for a group of people but for all of society, however that society is defined: nation-state, geopolitical community, indigenous culture, ethnic group, whatever.

Back in the day, we might have been called monks or scribes, curators or collectors. Today we might be called records managers, information officers, business process analysts, risk assessment specialists, access and privacy officers, or compliance managers. Our titles don't matter. What matters is that we keep evidence so that people can access and use that evidence however they want—whether to build a connection with their ancestors, prove their right to a pension, achieve justice in a court of law, or find documentary proof of a precious but vague memory from their childhood. The evidence we preserve and make available might be used in a legal case, as part of an anniversary celebration, in treaty negotiations, or as an illustration in a Ken Burns-style documentary film. And once one person has used the evidence we protect, the recordkeeper returns it to safe custody, as authentic and trustworthy proof, so that the next person can use it, for whatever purpose. Our goal is to preserve a trail of accountability, whether the trail is made of stone or paper, cellulose film or computer chips. We protect trustworthy evidence so that it may be used for any purpose, from the defense of rights to the identification of responsibilities, from the protection of identities to the sharing of memories or the telling of stories.

Recordkeepers are guided in this work by our ethical codes, which demand that we act as responsible stewards of evidence, defending its authenticity and integrity. We have an obligation to be as impartial and objective as possible. Our job is to protect the most authentic evidence, not just the evidence we like, in the same way a judge must uphold the law, not just the laws she likes, and a journalist must respect the facts, not just the facts he prefers. Sure, we have

opinions, ideas, and perspectives, like everyone else. But our primary responsibility is to serve as witness. Ever since hooded monks crept out of the castle with manuscripts under their tunics, to keep precious evidence from being destroyed, we have done all we can to ensure that trustworthy sources of proof are preserved, so that they can stand as *proof*.

In an information age, though, recordkeepers cannot do this work alone. We cannot wait for evidence to become “old” before we protect it. We cannot wait for records to pass slowly from office to storage room to archives over the course of a century. Digital sources of proof may not survive a year, never mind a century, if we do not protect them from harm from the moment they are created.

As I discuss in chapter 1, in the post-truth world we live in today, we are drowning in data, inundated by billions and billions of sources of information and evidence, from digital photographs to emails to text messages. At the same time, we live in a world where truth is a vanishing species; where lies and deception are becoming all too common and too easily accepted. To counter the onslaught, we—we the public, not just we the recordkeepers—need to understand the difference between truth, facts, and evidence, as I consider in chapter 2. Of course, we all carry personal truths. No one can deny me my right to believe that pancakes come from heaven. But some truths must be based on evidence: on sources of proof outside our own memories. But as I examine in chapter 3, what distinguishes evidence from data and information is its quality as a trustworthy and verifiable source of proof, ideally authentic, complete, and unchanged. And as I outline in chapter 4, evidence can take many forms, from a clay tablet to a digital photograph. The photographs of a Civil War battlefield are evidence, even though the photographer may have taken some liberties to make the image more evocative. A piece of data in a database can also serve as evidence, but only if we know why and how it was put in the database in the first place. Pieces of wood can be evidence, and so can Twitter messages. The complexity of modern evidence makes its management so much more complex today than it was three decades or three centuries ago.

But why should we care about evidence anyway? What is it good for? As I consider in chapter 5, records, archives, and other documentary sources help us confirm who we are and how we fit in the universe. They are tools we use to shape our identities and make connections. Evidence is also crucial to support justice and protect rights, as I suggest in chapter 6. How can we fight against war crimes without documentary evidence of atrocities? How can we ensure that refugees are protected without trustworthy proof of their rights and entitlements? And as I discuss in chapter 7, evidence also helps us craft personal and collective memories or adjust false or inexact recollections. Records and

archives are the stuff of history, but historians are not the only ones who rely on evidence for their work; journalists, authors, and scientists turn to sources of evidence to enhance their analyses and shape their narratives.

But evidence, particularly digital evidence, can be manipulated. As I illustrate in chapter 8, statisticians can misrepresent facts and ignore documentary proof in their quest to assert the findings they want. Leakers and whistleblowers may feel they are doing a service by releasing evidence to the public, but if they are not careful, the evidence they distribute could make conditions worse, not better. Computer hackers expose us to the dark side of evidence by hijacking, stealing, or destroying essential sources of proof. How can a society function if governments and businesses are locked out of computer systems or documentary evidence is held hostage?

If we are going to counter these threats and ensure that trustworthy sources of evidence remain accessible as tools to support accountability, foster identity, and preserve memories, we need to act. First, we need to shed some of our assumptions about evidence, as I discuss in chapter 9. We should not assume that our evidence laws are adequate or that our privacy is guaranteed. We should not accept that evidence is safe or that technology is stable. And we should not continue to march into a digital future without thinking hard—much harder than we do now—about the implications of digital technologies, not only for evidence but also in terms of economics, democracy, equality, and environmental sustainability.

Once we have readjusted our perspective on evidence, we need to act. As I argue in chapter 10, we need to acknowledge that evidence is not a casual by-product that can be overlooked on the assumption that it is okay and will remain so in perpetuity. On the contrary, evidence is a crucial resource that needs to be managed from the moment it is created, and for as long as it is needed, even if that is forever. We need to provide this enduring care by strengthening laws, improving the effectiveness (not just the efficiency) of technology, and raising public awareness of the importance of protecting trustworthy evidence. We need to work together, actively and persistently, to protect our society's documentary sources so that they can serve as evidentiary links between our past, present, and future. And we need to use these sources of proof actively and enthusiastically, as tools that allow us to tell stories, share memories, connect with our communities, or seek out the traces of our personal or collective past.

In the end, if we do not protect evidence, we cannot protect evidence-based truth. We will end up losing our trust in the instruments of democracy, as evidence is replaced with opinion, as good laws are overcome by bad, and as the

rule of law is flouted by people in power whose priorities are not the same as the public they are supposed to serve.

*We* need to act. But *we* are not just recordkeepers. *We* are not just politicians or bureaucrats or lawyers, statisticians or journalists. *We* means everyone. Today, each one of us probably accumulates as much evidence in a year, or a week, as our grandparents did in their lifetimes, and we store it all on a cell phone in our pocket. Given the fragility of digital technologies, we need to act vigorously and decisively if we are going to ensure that trustworthy evidence continues to serve as a protection against lies and deceit.

The time has come to change course. We need to find a new and more effective way—a collective and cooperative way—to combat lies. Evidence helps us support human rights, fight for justice, create a sense of identity, and shore up precarious memories. Evidence is the antidote to the toxicity of a post-truth, post-fact world. More than that, the diverse sources of evidence we create every day—records, archives, photographs, diaries, letters, text messages, tweets—serve as touchstones. They show the world that we were here. That we mattered. Without evidence, we all become just rumors and whispers and shadows. I hope you will join me in the fight for truth—for evidence-based truth.



# 1

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## “Fake news” and “Truthiness”

### *The Value of Evidence in a Post-Truth World*

*I have faith in the people. They will not consent to disunion. The danger is, they are misled. Let them know the truth, and the country is safe.*

Abraham Lincoln, 1861

**IN AUGUST 1977, NEW YORK TIMES JOURNALIST LEE DEMBART** reported on the Computermania exposition in Boston. He interviewed exhibitors and enthusiasts to understand why anyone would want to own the latest innovation on display: the personal computer. One sales representative likened computers to automobiles: people didn't see the value of a car in 1850, but now cars are indispensable. One day soon, he argued, computers would be seen the same way. Manuel Ulloa, a student at the Massachusetts Institute of Technology, offered the rather cryptic suggestion that he would want a personal computer because “you can take it in your room and turn the lights out.” (To each his own.) Steve Jobs, who had cofounded Apple Computer only a year before, suggested that financial investors could use his \$1,300 Apple II computer to chart stock prices, and radio operators could use it to figure out frequency skips. (Again, to each his own.) But Jobs admitted that “most people are buying computers not to do something practical but to find out about computers.” Dembart left the show stumped. “No one could say for sure why people might need a computer at home,” he concluded. “For fun’ seemed the most honest answer.”<sup>1</sup>

In today's information age, we use digital technologies for everything from the practical to the whimsical, the legal to the criminal. According to the statistics and business intelligence portal Statista, only 8.2 percent of Americans had a computer at home in 1984. By 2015, nearly 90 percent of Americans owned a personal computer. By 2018, however, most owners of personal computers

were over 30 years old. Fewer than 50 percent of people 18 to 29 years old owned a personal computer. More than 95 percent of them owned a smart-phone instead.<sup>2</sup>

We are surrounded by technology. Using that technology, we create more evidence now than we ever have before, but that evidence does not sit in static paper documents, the way it did only a few years ago. We don’t write letters like we used to; instead we send text messages and post status updates to Facebook. We don’t log financial transactions in bound ledgers; we input data into electronic spreadsheets. More and more of us pay our bills online, not with checks, and we share photographs on Flickr or Instagram rather than print pictures and mail them to each other. Even if we end up with a physical object in our hands—a printed report, perhaps, or a framed photograph—that object almost inevitably began life as a collection of bits and bytes.

### Drowning in Data

One of the computers on display at the Computermania show in 1977, the IMSAI microcomputer, came with a hard drive that provided 10 megabytes (MB) of digital storage.<sup>3</sup> (A byte is a unit of digital memory consisting of eight smaller units called bits.) That 10 megabytes, or 10 million bytes, may have seemed a cavernous digital space when a single floppy disk held 160 kilobytes. But a 10 MB drive will hold only one two-minute YouTube video, and not a high-definition studio production but a simple “How do you do it?” or “Look at my cute cat” video. Today people post over 300 hours of video to YouTube every minute. Can you imagine how many 10 MB hard drives we would need to store 300 hours of cat videos? (Okay, since you asked: 1.2 million.)

According to technology expert Bernard Marr, people around the world generate 16 million text messages, 156 million emails, and 1 trillion photographs every day.<sup>4</sup> This adds up to 2.5 quintillion bytes of data whirling across the globe. *Every day.* One quintillion is one with eighteen zeros after it. That number is unfathomable to me, but then I shudder at the sight of a decimal point. I have, with great effort (and a lot of help from clever friends), calculated this: if 2.5 quintillion bytes a day is equivalent to 2.5 billion gigabytes a day, then we generate 912.5 billion gigabytes of data every year. Now, the Hubble telescope (which despite its declining age still provides us with such amazing images of faraway galaxies) streams back to Earth about 17.5 gigabytes of raw data a week or 910 gigabytes a year. If we wanted to transmit all the data we generated in a year—912.5 billion gigabytes—from the Hubble telescope back to Earth, it would take . . . wait for it . . . one billion years. One million millennia. *Ten million centuries.*

Sure, we have faster technologies now than the Hubble telescope. But that's not the point. We also have faster, more powerful cars. A lot of good that has done us: our cities and countries are now designed around a dependence on combustion-engine vehicles, just when we seem to have realized that perhaps we ought to have developed more sustainable, less damaging transportation technologies in the first place. We are drowning in digital "stuff" and the only answer cannot be to design bigger life jackets. When scholars talk about the digital paradigm shift—the transformation from the mechanical and analog world to the digital world—part of what they are talking about is the reality that societies are generating such unfathomable volumes of information. But volume is not our only challenge. The real difficulty is determining what is valuable as evidence, why, and for how long.

It is easy to argue that property records or legal contracts are valuable evidence; how would we prove our rights without them? And we can feel confident that shopping lists or restaurant reservations are not worth keeping for very long; world affairs will likely not change if I cannot prove I purchased bananas last week. But what about family photographs? Are they all valuable? Only some? Which ones? What about government reports? Which ones are important? On which topics? Why? What about cat videos? Are they valuable? Which ones? Siamese cat videos get kept but tabby cat videos get tossed?

Some of the documentary content we create in a day is useful evidence for just a moment. Other items are critically important for decades, centuries, or millennia. But sources of evidence are valuable only if we can trust them. We need to know that our property records can act as legitimate proof that we own our house and garden. We need to know that our birth certificates are authentic, so that we can prove our legal identity and maintain a sense of connection with our family and ancestors. We need to know that our family photographs paint an accurate picture of our lives: how can we be honest about our family's past if Uncle Joe, the black sheep, has been cut out of the picture?

Back when evidence came in paper form, such as documents, reports, or printed photographs, or in analog form, such as sound recordings or celluloid films, we could confirm authenticity much more easily. It was easy to see if a letter was missing pages, a photograph had been cropped, or a report had been edited. It was not hard to see the splices in a film or hear the skips in an audio-cassette. It is much harder to see changes in digital evidence. How do we know that Uncle Joe has been cut out, or that Uncle Joe even existed? How do we know that a government pronouncement is authentic if it comes in the form of a tweet—posted on Monday, deleted on Tuesday, and reposted with completely different wording on Wednesday?

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