

**Memory Holes and Permanent Errors:  
The Preservation of Online News Corrections, Updates and Post-Publication Edits**

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## Introduction

Online journalism is at risk of disappearing. We often think of digital words as having permanence; for some, unflattering or invasive details linger way too long. But digital news is actually incredibly fragile. Whereas once major news organizations could rest easy that librarians were collecting their old issues or that reporters could dig up old material from the paper's own dusty "morgues," now few institutions regularly preserve digital news (Carner, McCain, & Zarndt, 2014). File formats evolve; storage units degrade; files get corrupted or disappear during migrations from one software system to another. All this leaves old stories to become increasingly unreadable or to disappear completely (Carner, McCain, & Zarndt, 2014). New story formats and platforms, including interactives, data visualization, user-generated content and social media raise even more questions of what should be preserved and how (Hansen & Paul, 2015). As veteran journalist and archivist Victoria McCargar writes, "The fact that digital archives are much more fragile than paper ones is a problem of which many publishers are completely unaware" (McCargar, 2011).

Such ignorance has a very real effect. For example, in 2002, the *Columbia Missourian* lost 15 years of text and several years of photography in a server crash (McCargar, 2008; Warhover, 2011). For many newspapers, their very first print issues are more readily available than content from the inception of their online product. In fact, interviews with 10 news organizations found that most newspapers' online archives went back no earlier than 2008, meaning "the opportunity to do serious historical research about the dawn of the digital news age is lost" (Hansen & Paul, 2015). And with news outlets' revenues under threat, the risk that many will go under — and take years' or decades' worth of articles with them — is grave.

Unlike their static print cousins, online articles can and often do change over their lifetime, and this poses difficult dilemmas. First, we must consider how archives treat errors in news stories and what are the problems inherent in preserving fallacious or misleading content. There is evidence that corrections are not being adequately preserved or clearly displayed, posing the risk that both current readers and future generations could be misinformed by archived news. At the same time, overzealous or opaque corrections can effectively "scrub" stories, obliterating the original error and leaving readers — including future journalists — unable to learn from mistakes of the past. Contemplating this scenario, one can't help but be reminded of the "memory holes" in George Orwell's *1984*, for which the Dodging the Memory

Hole series of born-digital news archives conferences was named:

“As soon as all the corrections which happened to be necessary in any particular number of the Times had been assembled and collated, that number would be reprinted, the original copy destroyed, and the corrected copy placed on the files in its stead... All history was a palimpsest, scraped clean and reinscribed exactly as often as was necessary. In no case would it have been possible, once the deed was done, to prove that any falsification had taken place” (Orwell, 1949, p.41).

Of course, this paper is concerned with overzealous and opaque approaches to corrections, not with the wholesale fabrication that Orwell describes. But the “memory hole” effect is the same: once an online story is scrubbed, readers are left no clues of the change that took place.

The mutability of online news raises other questions for preservation, even in the absence of errors or corrections. Online news items are frequently updated as more information becomes available to reporters. Should these changes be flagged up for future readers? How many and which versions should be saved? There are also cases in which news outlets make substantive post-publication changes to online articles that neither fix errors nor add breaking information but do alter the tone, tenor or content of a piece. Some editors argue that these changes are made to strengthen the articles — that if they have the means to improve a piece, they should do so. But critics have raised concerns that without alerting readers to changes, the news outlets are “stealth editing” and trying readers’ trust in the process. How should these changes be documented, if at all? Is there a public interest in preserving the earlier versions, and if so, how should this be accomplished?

This white paper poses important questions to consider and factors to weigh at the nexus between online news changes and news preservation. My research was anchored by four interviews with former and current library and editorial staff at two major news outlets, The New York Times and the Los Angeles Times. These interviews inform two case studies of correction and preservation practices at those outlets and also help to supply publisher perspectives throughout the paper. The word “archive” means different things to different players in this space, and throughout the paper I have tried to consider how varying incentives might influence proposed solutions to these preservation problems.

Due to the vastness of the issue under discussion, I have placed several limitations on

my research. This white paper examines only written journalism, not video, audio, interactives, social media or other formats. In keeping with the theme of the 2016 Dodging the Memory Hole conference, which sparked this investigation, the paper focuses on the problem of preserving journalism intended for online consumption. It does not examine questions of how readers of historical newspapers, now preserved as online PDFs, microfilms or on commercial databases, should be alerted to relevant corrections, though that is also a difficult and important issue.

It is my hope that this white paper can act as a launch pad for important discussions in the online news preservation space. The field is nascent. The questions raised here are therefore less about changing current practice than about properly designing future tools, technologies and workflows — most of which haven't even been dreamt of yet. They also serve as a reminder of one more facet of the news preservation problem, for which we must seek to align the needs of various groups: publishers, journalists, librarians, archivists, researchers, database vendors and, of course, readers.

## Current archival practices

“Online news archiving” means different things to different stakeholders, depending on their interests. Some approaches are well developed while others are little more than bright ideas. Below, I outline a few of the major modes of thinking about saving online news and sketch out the incentives driving work in each area. It should be noted that many approaches towards saving or collecting online news don't technically qualify as “archiving,” because they don't meet technical standards for ensuring longevity and fidelity.

### Internal archives

On the more established end are the archives that reside on news outlets' websites. News organizations have a strong incentive to maintain archives here, rather than bequeath them to memory institutions, because archives can be a substantial source of revenue. “The worry that someone else will profit from their copyrighted content has deepened the resolve of many publishers to tighten control of their digital content. So when memory organizations approach them about handing off their content to be preserved, there has historically been little trust,” write Carner, McCain and Zarndt (2014). Needless to say, all major news organizations

carry old stories on their websites, though they vary widely in the extent and searchability of their archives. The purpose of these archives is not merely to serve readers. Journalists have long benefited from referring to old stories, kept first in the paper archives known as “morgues” (Hansen & Paul, 2015). In the late 20th century, however, journalists increasingly came to rely on third-party databases such as Nexis (Carner, McCain, & Zarndt, 2014).

Professional archivists are concerned, however, that newspapers’ internal archives don’t adequately preserve newspaper contents. In fact, the word “archive” is likely a bit of a misnomer, given the lack of protections. Newspapers’ ad-hoc approach to keeping their old online content, often simply leaving stories in the content management system (CMS) used for publishing, is largely responsible for the fragile state of online news preservation described in the introduction to this white paper.

## Memory institutions

To “memory institutions,” librarians’ and archivists’ collective lingo for their organizations, relying on news outlets’ internal archives is untenable. These professionals argue that only by archiving news at responsible, sustainable, outside institutions can we ensure that the content will be available for generations to come. In this way, memory institutions hope to continue with online news the work they have done for decades maintaining hard-bound and microfilm copies of newspapers. “While the marketplace rewards breaking news, managing previously published news content has historically been someone else’s problem, most often a librarian’s,” Carner, McCain and Zarndt (2014) argue. They write that besides cost, lack of incentives and fear of losing content ownership, publishers are also hamstrung in their preservation efforts by a lack of expertise and understanding.

The most potent memory institution in web preservation today is the Internet Archive (<https://archive.org>; McCain, 2016b). The non-profit’s Wayback Machine is a digital archive of the World Wide Web, including multiple versions of particular pages as they change over time. It has so far saved over 279 billion web pages (Internet Archive, n.d.). But such content is piecemeal (Hansen & Paul, 2015); it is not collected or catalogued in any consistent way because no organizations have made commitments to do so. Furthermore, the content is not truly functional; many links suffer from “link rot” and no longer work. Other content is written in outdated programming languages and no longer displays (McCain, 2016b).

Beyond the Internet Archive, the preservation of online news at memory institutions is

almost unheard of. This is because news organizations fear the potential threat this might pose to their revenues, and memory institutions do not have enough funding to compensate news outlets for their losses. A survey by the Reynolds Journalism Institute found that only 11 percent of online-only news operations were supplying content to memory institutions (Carner, McCain, & Zarndt, 2014). For hybrid organizations, the figure was 60 percent, but for many organizations this could well be limited to print content (McCain, 2016a). A notable exception is the Library of Congress's web archiving program, which aims to create a snapshot of how particular websites look at particular points in time, including HTML coding, images, audio, video and PDF files (Library of Congress, n.d.). The library recently instituted a focus on archiving born-digital news sites such as BuzzFeed and Vox (Zwaard, 2016).

One proposed solution for wider preservation is for memory institutions to place online news into "dark archives," with material only made public once it is out of copyright (Carner, McCain, & Zarndt, 2014). Another possible solution is for the Library of Congress to enforce its right of deposit for online material. The U.S. requires that copies of copyrightable works be sent to the government for preservation at the Library of Congress, similar to the practice found in many other countries, which requires deposits with their own national libraries. But, like many other countries, the U.S. has carved out an exemption for digital-only works (Zarndt, Carner, & McCain, 2015). If news outlets were compelled to provide their online content to the Library of Congress, this would circumvent the current financial roadblock.

## Technology NGOs and start-ups

Another type of player to consider is the technologist. Small tech ventures, usually side projects of professionals in journalism, library science or computer science, have been experimenting with news archiving solutions. Some of these bypass traditional memory institutions and appeal directly to individual users. For example, NewsDiffs ([newsdiffs.org](http://newsdiffs.org)) is a website that automatically detects and documents changes made to online articles at five news outlets: The New York Times, Washington Post, CNN, the BBC and Politico. Such technology-led efforts are often experimental, but their approaches could be expanded through investment in the start-ups or adopted by more established organizations.

## Database vendors

The final party to consider in collecting online news is the database vendor. These companies offer online news content in the products that they sell to end-users, including universities, public libraries, other memory institutions and commercial clients, which include news organizations themselves. This is already happening on a fairly large scale, unlike the deposit of online content with memory institutions. For example, the database Proquest carries content from over 1,200 newspapers and over 200 blogs, podcasts and websites (Proquest, n.d.). Most vendors don't publicly disclose data on their subscribers and revenue, but based on the size of their holding companies, the largest are likely LexisNexis, Proquest, Factiva and Newsbank (Carner, 2016).

Like news organizations themselves, database vendors are driven by a profit motive. They preserve online news stories because it is profitable to charge customers for accessing those stories. This presents several issues for those who wish to see online news preserved. First, there is no guarantee about what might happen to the vendors' stock of news articles should they go out of business. Second, any of the solutions discussed here for dealing with errors, updates and large-scale edits will be non-starters if they require cooperation from database vendors, but don't reward vendors for their efforts.

## Errors

### History

The media's relationship with their own mistakes has been flawed from the start. Even into the 1970s, there was little rhyme or reason to the placement of corrections, and little consistency. Some newspapers would constantly change the name of their corrections columns (Silverman, 2009, pp. 228-229). In fact, printing corrections was often regarded as a sign of weakness (Shepard, 1998). Eventually, it became common practice for newspapers to select a space where they'd place corrections each day, usually page A2 (Silverman, 2009, p. 229). This at least ensured that readers who wanted to read corrections would know where to look. And by the turn of the past century, newspapers came to see corrections as a way to highlight their



fairness and gain reader trust (Shepard, 1998).

But this was far from an effective way to correct mistakes. Someone who read an errant story on Monday was unlikely to read the correction printed on Tuesday or Wednesday. Even if she did read both the original and the correction, it was often unclear just what information was being corrected and how, especially when the old paper had already served double-duty as kindling, fish wrapping or bird-cage liners.

The move to online news offered a chance to rectify some of these difficulties. News organizations were slow on the uptake, though they realized that online stories offered the fundamental distinction of being “continuously published,” and therefore allowing corrections to be made at any time (Ang, 1999). Before the end of the 20th century, editors also had crystallized a dilemma about whether archives should be “error-free” or the stories should be left as they were on the day of publication, with one commentator complaining, “Errors large and small can be corrected at any time, erased into the ether as though they never happened” (Joe Salkowski, cited in Ang, 1999). Some prominent news outlets clung to outmoded ways of thinking, however, maintaining that there was no need to add corrective information to errant stories. They essentially argued, “If we didn’t do it for print, why do it for digital?”

## Problems with corrections today

Slowly major news outlets began to abandon this outmoded attitude, for several good reasons. First, online news has a “long tail.” Whereas once month-old or year-old stories were unlikely to reach anyone beyond researchers, now our Google searches constantly call up articles that old and older. Social media also drive readers to old stories, as do hyperlinks: from other news stories, from blogs, from Wikipedia. Every time someone finds that old, mistaken article, the misinformation has a chance to spread anew.

Second, we’ve learned much since the print days about how the human brain processes information. We’ve learned that even when people read a correction and agree that the initial information was false, the misinformation might continue to affect their attitudes (Nyhan & Reifler, 2012). This gives news outlets all the more reason to correct mistakes quickly and to get them in front of the original story’s readers. The diversity of news sources today also makes it less likely than ever that the reader of a story will just happen across a correction to that story (Cornish, 2010).

Still, archives including vendor databases often allow errant information to pickle away, unnoticed (Silverman, 2009). This problem was recognized, and solutions urged, 18 years ago: “If a correction notice is run and the error is left to stand, then there should be a means of permanently linking the correction notice to the article in question” (Ang, 1999). But the issue persists. And it’s much worse than misspelled names: even made-up quotes by the disgraced New York Times reporter Jayson Blair linger in the ProQuest database without any corrections or editors’ notes attached (Blair, 2000; Blair, 2003; Corrections, 2003; Zwerling, 2007).

But even with these problems, the New York Times is comparatively an “A” student in the corrections world. At least its corrections are retrievable from a newspaper database. More worrying are the corrections that disappear into the morass of online content, because they aren’t preserved externally or catalogued by the news outlet in any consistent way. A study of 15 major newspapers found that eight didn’t have a corrections section on their website. Seven failed to link corrections to the original articles (Weiss, 2011). Because so few news outlets maintain centralized online corrections pages, it is difficult to assess whether they’re making the necessary fixes or addenda to their archived articles.

And the “D” students are those that rarely or never post corrections at all, a phenomenon that by its nature is difficult to study. The fluid nature of online publishing seems to have encouraged such behavior. “Unfortunately, too many papers merely ‘scrub’ the text of the article to eliminate the incorrect information, never advising the reader of the error or the correction,” Craig Silverman (2009) writes in *Regret the Error*, a critical appraisal of corrections policies. “Scrubbing is, in effect, a cover-up. It’s unprincipled and disingenuous” (p. 234). He also reports that many newspapers publish corrections in their print editions but not on their websites (Silverman, 2009).

These conditions suggest three key questions to consider for the preservation of online news:

1. How can we make sure that current and future readers see all the corrections that pertain to the articles they read?
2. How should archives display correction notices?
3. Should the original text be changed in archives?

## Discussion

When we ask how corrections should be displayed to readers, current and future, it's important to keep in mind the varying incentives at play. News outlets tend to value the archived stories on their own websites not just because there are established mechanisms for these to bring in revenue but because this — rather than an external archive — is how the outlets reach most readers. By far, the majority of people reading old New York Times stories reach this content either through exploring NYTimes.com or, more likely, through Google, standards editor Philip B. Corbett says. “For the vast majority of people out there, that is really the archive of The New York Times these days,” he says.

Henry Fuhrmann, who until December 2015 was the Los Angeles Times' assistant managing editor and head of the newsroom's Standards and Practices Committee, defines the paper's corrections priorities as three-fold: “There's the reader, first and foremost. That's where a forthright approach is fundamental. We're establishing our credibility by saying, ‘Yes, we make errors, we fess up to them, and we tell you as early as we can what happened’ ... There's the source audience as well: ‘We covered you, we made an error, we owe it to you, the source, to correct the record.’ That's pretty basic, too ... The last audience to serve is the current and future staff. Every time we publish, we are adding to the collected record of the L.A. Times going back to December 4, 1881 ... So when we are aware that we've made an error, it's incumbent on us to correct because each article is a clipping online or in print that will be used by a future member of the staff or maybe a researcher.”

When it comes to archive accuracy, publishers' priority is therefore to make sure that errant stories on their own websites somehow alert readers to the corrections that were made. Even in this department, standards vary widely. The New York Times and Los Angeles Times are top performers: when an error (other than a typo) is found in an online article, these outlets add a correction notice to the article and link to the article from their corrections webpages. Other publishers don't perform so well: A Columbia Journalism Review survey of 665 magazines found that 45 percent correct online factual errors, or errors more substantive than mere typos, without alerting readers (Navasky & Lerner, 2010). As of 2010, a study of 15 major newspapers documented that seven, The Washington Post, Chicago Tribune, USA Today, San Jose Mercury News, Philadelphia Inquirer/Daily News, Denver Post and the (Minneapolis-St. Paul) Star Tribune, failed to link corrections to the original articles. Major born-digital outlets

were even less likely to link corrections to articles (Weiss, 2011). Born-digital publications were also less likely to have designated corrections pages on their website and less likely to explicitly tell readers how to report an error (Weiss, 2011).

It is no surprise, then, that news outlets are generally ill-prepared to ensure the accuracy of outsourced archives like LexisNexis. The New York Times pushes a new version of each corrected online story to database vendors, replacing errant versions. The Los Angeles Times does the same though only Factiva carries its online stories. But a systematic quantitative study would be required to more precisely determine how often each outlet's corrections tend to be reflected in website and database archives. Even this lack of information is itself instructive. It shows little change from 2010, when one researcher wrote, "It is unclear whether an online story that contains misinformation will have information corrected in all archived versions or only in later updated versions or both. This lack of a clear policy is troubling when we consider the function of archiving—to capture the present so that future generations might get a clearer picture of the past" (Cornish, 2010).

External archivists like the Internet Archive and the Library of Congress bring additional confusion to this picture. Any such efforts that capture snapshots of website front-ends, rather than receiving feeds from the publishers' CMSs or back-ends, cannot make claims of completeness. For example, if the Los Angeles Times posts a correction or update on an online story, the Internet Archive will display an outdated version of the article until it happens to crawl that article site again, or until a user manually forces such a crawl.

We must ask, then, how news organizations can be encouraged or enabled to improve corrections practices, for both articles in their internal archives and those pushed to database vendors. Establishing principles and brainstorming solutions now could also help ensure that memory institutions and technologists consider the role of corrections in their future initiatives.

## Standardization

One of the hurdles to clear display of corrections in archives is the lack of a standardized, structured format across the industry. Los Angeles Times data editor Ben Welsh compares this to the structured data that enables the archiving of photographs. Industry standard metadata allows every digital photograph to carry information about time and date, location, the type of camera used and so on. Standardized fields make it easier for photography

archives to catalogue pictures from a variety of sources and for users to specify search parameters. Of online news, Welsh says, “We just totally failed to follow that example.” The myriad CMSs in use by publishers, not to mention the various news databases, structure the same types of data in many different ways.

One way to solve this would be to leverage commercial pressures. Welsh notes that publishers do employ standardized metadata on their stories to enable Google to more easily crawl and index those articles. This system gives publishers access to millions of pageviews, via Google search and Google News results. So Google or even Facebook could similarly create a structured standard for how publishers should represent corrections in their HTML coding. This same data structure could be used in publishers’ CMSs and also extended to external databases. And it could even be used to more easily get corrections in front of the original articles’ readers, if Google or a social media company developed that functionality. For example, Facebook could track if a user clicked on an article link, and then alert that reader if the article is corrected.

## Accuracy vs. purity

One more question remains for the display of corrections in archives, one on which publishers might never agree. The New York Times and Los Angeles Times illustrate this key difference. The New York Times changes the original text so it is no longer in error. But the Los Angeles Times chooses to leave the original text intact, and rely on the correction notice alone to steer readers away from misperceptions. There are a few exceptions, however: The Los Angeles times will change the original text to correct misspelled names, incorrect websites and phone numbers, and typos. In addition, if the newspaper becomes aware of an error in the time between posting a story online and the end of the print publication day, it will make changes to the online story text.

When this debate began, one key argument against text changes was the idea that the text as published was “sacrosanct” (Thompson, 2004). As databases became more popular, librarians began to realize the drawbacks of this approach. For example, Los Angeles Times archivists found that searches wouldn’t return results with misspelled names. But librarians feared that if they started fixing even small errors, lines would blur and staff would be faced with making ever more substantive changes (Thompson, 2004).

Proponents for changing errant text countered that a prime purpose of electronic

archives is to disseminate the truth. Every time someone views a mistake in the archive, they run the risk of being misinformed. And if the correction is not sufficiently prominent, readers may miss it. Such was the case with a 2004 Washington Post article, which incorrectly reported that then-U.S. senator Mark Dayton influenced coverage at the St. Paul Pioneer Press. At that time the Post added corrections in a separate box “below the fold,” on the right side of the screen, where the notice could easily be overlooked. And indeed it was: the story was repeated without correction in publications including the Omaha World-Herald and the Drudge Report (Thompson, 2004).

This issue becomes even more complex when it comes to articles that are riddled with errors or wholly fabricated. Back in 2007 ProQuest search turned up stories by the infamous New York Times plagiarist and fantasist Jayson Blair without any of the editor’s notes that called out the falsehoods (Zwerling, 2007). I was similarly able to find un-appended Blair stories on ProQuest in December 2016 (Blair, 2000; Blair, 2003; Corrections, 2003). In one, Blair misidentified the Air Force base where a police chief served. In another, he attributed a quote to a Queens College professor, who later told the Times he did not utter those words. For such cases, simply appending the correction would be a much-needed start. Some would argue that archives should go further and fix errors in the text. But if the lesson to be drawn from the Blair episode and similar scandals is actually the mistakes themselves, does that mean that the errors should be saved for posterity?

It’s possible this debate will never be resolved. So archives must continue to respect publications’ difference of opinion while still making sure that readers see the corrections they need.

## Updates

### History

Another type of article change to consider in news preservation is the update. Early on, editors realized that the fluidity inherent in the World Wide Web makes this an ideal medium for reporting breaking news. Stories can be updated to reflect information that was previously unavailable, or that was initially mistaken. Unfortunately, this fluidity poses a headache for

archivists, who are left to grapple with the question of which is the “canonical” version of the story.

For example, a change log of the New York Times’ initial coverage of the Newtown massacre in Connecticut, compiled by NewsDiffs, records 19 versions of the story between 12:09 p.m. on December 14, and 10:12 p.m. on December 17, 2012. Additions included the number of fatalities, identification of the perpetrator, eyewitness accounts, reporter observations from the scene, information from police briefings, reactions from political leaders and contextual information (such as “among the worst mass killings in United States history”). Other changes included tweaks to the headline and deletion of no-longer relevant phrases (“those reports could not be immediately confirmed”; NewsDiffs, 2012). ProQuest carries the final text though it gives a December 14 dateline (Barron, 2012).

It may be unnecessary for most casual readers, but students and researchers in media studies would likely benefit from seeing how breaking news stories are reported in their earliest stages and how those stories then evolve. In the future, we will need to understand “not just what happened, but how the processes of journalism shaped and affected what happened.” (Clifford Lynch, Dodging the Memory Hole 2014 conference, cited in McCain, 2015). Therefore, key questions for update preservation include:

1. Should we save any story versions that predate the final version?
2. How many and what versions should be saved?
3. How should different versions be displayed? How should changes be noted?
4. Inevitably, when covering a breaking news situation, some reported information will turn out to be false. How should this be handled — the same as any other update? As an error? Or as some kind of hybrid?

## Discussion

Publishers describe online story updates as a continual practice. “A huge percentage of the articles that we publish online get revised, and updated, and improved, and expanded, and re-edited, during the course of the day,” The New York Times’ Corbett says. “That’s not a rare thing. That’s what we do. That’s a constant thing.” The motivation is to give the reader the most accurate and complete picture possible at each point in time, so Corbett says he has little

incentive to flag up non-correction changes or to give readers the option of reading different versions. “Honestly, I think in the overwhelming percentage of cases, for the overwhelming majority of readers, they don’t care. They come at 3 o’clock in the afternoon, they want to see what can The New York Times tell me about this topic at 3 o’clock in the afternoon. They really don’t care what we told readers about that topic at 10 o’clock in the morning. They don’t care what additional quotes have been added, what other quotes have been taken out to make room for the new quotes, what’s been moved up, what’s been moved down.”

The Los Angeles Times take a different approach, adding an “Update” line with a timestamp to notify readers when an article on latimes.com has been changed - for example, to reflect new information on the number of injured in an accident, or to add a quote. At the same time, Los Angeles Times library director Cary Schneider questions if these changes really need to be documented in archives. “I think most people want to know the facts, and they really don’t care, for example, how a death toll changed every few minutes, as reported by one paper,” he says. And he foresees another problem with creating versioned archives. “If there’s a correction that has to run, it has to be attached to all those versions. All of those versions would be replaced with a correction on them,” he says.

But the fluidity of online news presents a hurdle for archivists, argues Hjalmar Gislason, vice president of data for analytic software company Qlik, and chairman at Icelandic media company Kjarninn. “It almost puts the archivist in the situation where you need to first of all acknowledge the fact that you are storing just one version of a story, and it’s not 100% coverage... To properly archive, the only way to do it today is to frequently scan all of the articles.” Gislason says the lack of multi-version archiving is a problem because the changes publications make can be misleading (as discussed in “Large-scale edits,” below), but also because it’s undesirable for different readers to disagree on what the story actually said - and for them all to be right. “From the archivists’ and readers’ side, it’s more that somebody may refer to a version of the article that was different from what somebody else saw. It might be very confusing, and reflect badly on the person referring to it.”

Gislason would like to see news preservation apply something like the NewsDiffs approach: revisiting publications at different intervals, and showing readers what’s changed. But he acknowledges that this will take more resources than memory institutions currently have at their disposal. “Many of them are struggling to get to the point where they can archive [online news] at all,” Gislason says.

The Los Angeles Times’ Ben Welsh says that creating versioned archives of news



stories requires surmounting several barriers. First, the news organization actually has to save multiple versions of its stories, which is not necessarily the case, currently. Both the Los Angeles Times and The New York Times save multiple versions in their CMSs; but publishers also have to anticipate frequent changes to CMS systems and ensure all articles are saved in a standardized, long-lasting format. Second, the publisher must decide what sort of user interface it wants, and third, decide how code will surface various versions from the publisher's database. Finally, Welsh says, "You'd have to have the will do it — which is often the most difficult thing."

NewsDiffs offers one potential model for a user interface, Welsh says. In a similar vein, the Twitter account @NYT\_diff tweets a snapshot of the changes made when an article is updated. These projects work independently of publishers, an approach that has advantages and disadvantages. On the one hand, third parties can act as neutral watchdogs; on the other hand, their resources are limited. A news outlet that saves all past versions of a story knows how many there are, so it could theoretically share them all with the public. A third-party service like NewsDiffs can only crawl the news site at intervals, and may not pick up on every change.

The Memento protocol created by Herbert Van de Sompel and Robert Sanderson of the Los Alamos National Laboratory, together with Michael Nelson of Old Dominion University, offers another potential way to surface changes. When a user visits a webpage supporting the Memento framework, he can see past versions of the site by specifying a date and time. If newsroom CMSs had Memento built in, they could receive and respond to these requests. In fact, Welsh has built a Memento plug-in for Word Press and says it wouldn't be difficult to build the protocol into newsroom CMSs.

But Welsh notes that such a system would be "content neutral." Simply showing readers that an article has changed doesn't alert them to whether the change was due to an update, correction, or something else. Making those distinctions might require the type of standardized metadata discussed in the Correction section, above.

## Large-scale edits

### History

Finally, we should consider cases where news outlets make significant changes to a

piece, for reasons other than errors or breaking news. One such situation that has received particular attention is “stealth editing”: when a news outlet fails to alert readers to the changes made. The changes that come in for the most criticism tend to be those that alter the tone or meaning of a story.

Famous examples include The New York Times’ changes to an article on Bernie Sanders, making the piece more skeptical of the candidate’s prospects, and more measured in its praise. Hundreds of readers expressed disapproval of the change (Sullivan, 2016). In another example, The New York Times was widely accused of sexism when it began the obituary of a scientific pioneer thus: “She made a mean beef stroganoff, followed her husband from job to job and took eight years off from work to raise three children” (NewsDiffs, 2013). It later moved the words “brilliant rocket scientist” from the second paragraph to the first, replacing the beef stroganoff.

The New York Times has been particularly prominent in these discussions, perhaps because of its reach and prestige, and perhaps because of the frankness of its public editors, who have disagreed with these unmarked changes. But other outlets do it too. For example, Politico was criticized when it deleted paragraphs critiquing the media-handling skills of the then-commander of U.S. forces in Afghanistan, General Stanley McChrystal (Hendler, 2010). It’s difficult to say how often these changes happen, however, or which outlets do it most frequently. NewsDiffs finds hundreds of changes per day in its five target outlets, but most are minor tweaks or updates. The prevalence of “stealth” editing is, as the name implies, unknown.

The reasons news outlets give for stealth edits (when they are forced to give a reason) vary. The organization might say the article was not balanced, lacked context or more generally “did not meet our standards.” It might argue it has an obligation to improve the grammar, flow, tone and so on, in the same way as it would for an unpublished piece. Critics often charge more insidious rationale, such as the paper bowing to pressure from politicians or advertisers. Such charges are difficult to prove, and the news outlets in question usually deny these motivations.

Key questions about the role of large-scale edits in online news preservation include:

1. Should we save any story versions that predate the final version?
2. How many and what versions should be saved?
3. How should different versions be displayed? How should changes be noted?

## Discussion

Here, the question for preservation is less the potential of archives to spread misinformation and more how much transparency we should be demanding from news organizations. Current New York Times public editor Liz Spayd says readers are “far more sophisticated than they’re given credit for” — they do notice changes, and they want these explained. Giving them those answers “conveys openness and reduces suspicion,” Spayd says. She compares substantive unflagged changes to “a doctor who sits a patient down to discuss troubling test results, then later rethinks that analysis and mails the patient a more accurate interpretation of the results, without highlighting the changes” (Spayd, 2016b). Her predecessor Margaret Sullivan argued that except for breaking news, “digital platforms ... are not a test run,” so editors should take the time to get the pieces right before publication (Sullivan, 2016). Fortune’s Matthew Ingram (2016) sums up that point succinctly: “Editing stories after publication doesn’t build trust.”

A poignant example, albeit one that editors did draw attention to, appeared in The New York Times in July 2016. At first, online readers of the piece by Georgetown University professor Michael Eric Dyson found a sharp critique, describing “an undeclared war against blackness” (Spayd, 2016a). But then an African-American sniper in Dallas killed five police officers, four white, one Mexican-American, and the piece was radically changed. The undeclared war became “racial justice feels elusive.” Editors appended a brief note about the change, but some readers were angry. They thought the explanation was too brief and too vague and asked whether opinion pieces should ever be changed retroactively in this way. “And what about the ‘record,’ or perhaps the imprint, made by the originally published piece?” asked occasional Times freelancer Rand Richards Cooper. “Is it simply gone forever?” (Spayd, 2016a). It is indeed arguable that future historians, students and journalists would benefit from seeing both versions of the piece, especially given the national prominence of these issues and of the events in Dallas.

On the other hand, Corbett argues the impracticality of highlighting all changes for readers. “Both in technical terms and in terms of how the newsroom functions, and how readers read our material, I think to very frequently be putting notes onto stories saying this story has changed because we had this new information, or an editor decided that such and such a point was less important, so he moved it down in the story and moved this other point up instead

—aside from other journalists, and media critics and academics, I’m not sure how many readers would really, truly benefit from that on a routine basis.” And he argues that if editors can improve a piece, they should. Margaret Sullivan concedes that if The New York Times put an editor’s note on every article it changed for non-error reasons, “Nearly every article would require an accompanying editor’s note about why, for example, a particular quotation was added or another removed, and so on. Or various versions would need to be available online” (Sullivan, 2013).

Many of the technical ideas and hurdles discussed in Updates, above, also apply to large-scale edits. But Qlik’s Hjalmar Gislason says the argument for versioned archiving is particularly strong when it comes to large-scale changes. When newspapers don’t own up to the need to make major overhauls to a piece, Gislason says, “That undermines that publication in my mind. They should be more transparent.” The incentives for documenting large-scale edits, however, can be very different from the incentives for documenting updates. When we know that publications often lack the will to show their readers how breaking news changed, how can we expect them to detail every single misstep in their reporting and editing?

Some might argue that this is exactly why third-party projects like NewsDiffs exist: to do the documentation that publishers won’t. Perhaps this is a task that memory institutions should take on and should seek funding for. But it could arguably be dangerous for librarians and archivists to set themselves up in this somewhat adversarial role.

## Conclusion

What will future generations learn of our time — and our journalism? Already this rough draft of history is patchy and incomplete. Some news articles have been lost forever; many more are under threat. But as librarians, archivists, journalists and technologists begin grappling with how to save valuable news content, they must contend with the many layers news stories acquire over time, like the rings of a tree trunk.

The most critical layer is corrections. To prevent the needless spread of misinformation, articles must be saved together with their related correction notices. In the short term, this could mean that database vendors develop functionality that links corrections and articles or that more publications adopt correction web pages and linking systems akin to those of the New York Times and Los Angeles Times. There doesn’t seem to be commercial demand for these

changes, however. So these questions are perhaps better addressed by the next-generation news preservation efforts now being envisaged.

Beyond correction notices, designers of future archival systems will need to make a series of choices about what to save, what to display and how. This includes whether to change errant text, what versions of a story to save, how to display updates (if at all), and when and how to alert readers to edits. We will likely see a tug of war between interests and principles: transparency, accuracy and completeness versus faithfulness to historical record, ease and cost of maintenance, ease of reader use, fear of overwhelming users and the risk of emphasizing marginal aspects of the content.

Perhaps the thorniest debate will be over trust. At a time when confidence in the mainstream media has never been lower and the end of traditional journalistic gatekeeping has enabled the wide dissemination of hoaxes and lies, how can news preservation practices help rebuild reader trust and not further dismantle it? Many would argue that we need nothing less than total transparency: that journalists earn trust by quickly admitting when they're wrong, clearly correcting the record and opening a window onto the reasons behind their decision-making. But news outlets' transparency can be turned against them, especially in an era when political leaders are openly hostile towards the media. Witness how Donald Trump misrepresented a post-election letter The New York Times sent to its readers. The letter asked whether the newspaper underestimated Trump, but the president-elect characterized the message as "apologizing for their BAD coverage." Such episodes of information weaponization give credence to the concern that critics of a particular news outlet could easily cherry-pick a few items from large listings of corrections or edits and represent the outlets as they wish.

My own preference leans toward transparency. As the information ecosystem gets more complex and confusing and readers find it harder to know who to trust, good journalism can point only to its relative ethical strength and sound methods as its distinguishing features. We cannot ask readers to accept those strengths simply on the basis of outmoded authority or of centuries-old names; we must prove it in writing. But the weaponization concerns are valid, and such outcomes should be considered in news preservation planning.

Finally, while news preservation often concerns itself with "the future," we must recognize that news archives represent a valuable resource in this very moment. News editors are, by nature and title, obsessed with the new; they too easily assume that their readers are always seeking the latest information. But as the recent wave of "explainer" journalism recognizes, readers are often seeking to deepen their understanding. Why did Syria erupt into

civil war? What are my taxes being spent on? Is nuclear power safe? Such “evergreen” questions often lead contemporary readers to newspapers’ online archives, but the archives are rarely structured in such a way as to help provide answers. Greater attention to clarity in correction, updates and editing is but one step news websites could take to turn archives into useful, revenue-generating content. In other words, it may just be possible to simultaneously serve readers of the future, and the readers of today.

## Appendix A: Case studies

### *New York Times*

The New York Times’ style guide sets out a brief corrections policy that is publicly accessible; this policy addresses the news outlets’ ethical responsibility to correct errors, good practice in correction wording and other generalities (FAQ: Corrections, n.d.). Standards editor Philip B. Corbett says that when it comes to more granular decisions about whether and how to change already-published stories, The New York Times has a set of generally accepted practices but not a policy per se. “I suspect that if you’re searching for a clearly delineated, absolutely set-in-stone policy from us or anyone else, you’re going to be sorely disappointed,” Corbett says. He asserts that “for every rule, there are many exceptions,” so the publication of such rules would only create a situation in which the Times repeatedly broke its own policy.

Corbett says the The New York Times’ fundamental corrections practice is as follows: If there is a factual error in a story online, the outlet will both correct the text of the story and append a corrections note. If the story appeared in print, it will also publish the corrections note in the print version. The Times then sends a corrected version of the story to LexisNexis and other vendors to replace the errant version.

Where Times practices get more controversial is when it makes changes to its article text without notifying readers. These changes occur for a variety of reasons and do not include errors, per se. As Corbett notes, it’s common for online articles, not just at the Times, but throughout the online news universe, to be updated as events unfold. From its infancy, the transitive and real-time nature of online news has lent itself to this function, which offers several

advantages for readers. “That’s good for readers because it means that they can come back and read a story two hours later and if anything has happened, or the reporter has had an opportunity to spend more time with it, or has been able to write more details or clarify things, then they get the best version that we can give them.”

In the “overwhelming majority” of these cases, Corbett says, the Times doesn’t flag up the changes for readers. The reason is simply that readers are unlikely to care. “Honestly, I think in the overwhelming percentage of cases, for the overwhelming majority of readers, they don’t care. They come at 3 o’clock in the afternoon, they want to see what can the New York Times tell me about this topic in 3 o’clock in the afternoon. They really don’t care what we told readers about that topic at 10 o’clock in the morning. They don’t care what additional quotes have been added, what other quotes have been taken out to make room for the new quotes, what’s been moved up, what’s been moved down.”

There are other cases, Corbett says, where a story gets substantially revised and the paper chooses to explain the changes to readers in an Editor’s Note. In most of these cases, the first version lacked factual errors but had a significant flaw: for example, it criticized someone but never gave him right of reply. And yes, he says there are times when the news outlet feels it’s best to continue editing after publication. “There’s a school of thought that feels like the news organization should go a lot further in much more routinely walking readers through the fact that a story has changed in some way. I don’t object to that in principle. In principle it’s hard to be against transparency and openness with our readers. But as a practical matter both in technical terms and in terms of how the newsroom functions, and how readers read our material, I think to very frequently be putting notes onto stories saying this story has changed because we had this new information or an editor decided that such and such a point was less important, so he moved it down in the story and moved this other point up instead: Aside from other journalists, and media critics and academics, I’m not sure how many readers would really, truly benefit from that on a routine basis.”

Corbett raises several objections to the proposal for transparent versioning outlined in this white paper. The first, he says, is that rarely do queries about changes come from disinterested, ordinary readers. Instead, they come from media critics, public editors, academics and partisans. Most of these are looking for a reason to criticize Times coverage, he says. “I think there’s a reasonable question ... as to whether, if this sort of versioning idea that you’re talking about existed, whether [its] main use ... would be to try to undermine our journalism and our editing process by selectively using this data to show, ‘Oh, here’s a case in which they

changed this story to add a quote that's bad for Candidate A,' or, 'Here's a case where they went in and took out a passage that was good for Candidate A,' or whatever it is."

Corbett says that perhaps the strongest argument for transparent versioning is its use to researchers. But he points out that this purpose doesn't align with his own incentives and responsibilities as an editor. "I think that is the strongest argument for that kind of material. But it's not the top of my priority list, as an editor here in the newsroom today, to think about what's going to be best for scholars 50 years from now, looking back on the coverage."

## *Los Angeles Times*

Like the New York Times' style guide, the Los Angeles Times' ethics guidelines outline a general approach to corrections. The Los Angeles Times also has a set of internal corrections guidelines, mostly instructions on how to input corrections into the paper's CMS. The organization's practice is to append a "For the Record" notice to every errant story but generally not to change the original text. There are a few exceptions: correcting misspelled names, incorrect websites and phone numbers, and typos, for example. In addition, if the Los Angeles Times becomes aware of an error in the time between posting a story online and the end of the print publication day, it will make changes to the online story text. In this case, a correction will be appended to the online story right away, and a For the Record will run in the next day's print edition.

On online articles, the "For the Record" notice generally appears in a column at the top right of the page, where readers' representative Deirdre Edgar says it will be difficult for readers to miss. In print, the Times runs corrections every day on page A4. The daily list of print corrections also get posted online at [www.latimes.com/corrections](http://www.latimes.com/corrections), where a web producer usually links them to the original stories, though the Times sometimes falls behind on this task. The news outlet does not post a list of the online corrections it has made.

Edgar says these practices are based on the Los Angeles Times' philosophy that its publication is part of the public record. Running corrections is transparent, she argues, but changes to the public record are not. "We bite the bullet," she says. "We're not in the business of erasing. We're in the business of publishing."

Like the NYT's Phil Corbett, former Los Angeles Times' assistant managing editor Henry Fuhrmann says Times online articles tend to evolve as more information becomes known.



Information could be added or the entire article rewritten from top to bottom. Here, too, the two outlets diverge in their approach. Unlike The New York Times, the Los Angeles Times appends an “Update” notice to alert readers that a change has been made. The Update, which the reporter or editor manually enters into the CMS into its own field, gives the date and time of the change and the general type of change made, such as, “This article has been updated with comment from the White House.”

Fuhrmann’s main objection to widespread public versioning is similar to Corbett’s. “I think it’s a question of signal-to-noise ratio. You’d have so much information; how would you be able to discern what’s useful? ... I’d like to see every version of an article if I were really interested in a subject, but for many readers the data would probably be overwhelming.”

## About the author

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