

The Whole Story: News Agency Photographs in Newspaper Photo Morgue Collections

Laura McCann

ABSTRACT

Newspaper “photo morgues” have traditionally served as archives for images, both published and unpublished, that have the potential for future use. The contraction of the newspaper industry and the steady displacement of print by digital technology have led to the acquisition of numerous photo morgues by university and public libraries, archives, and museums. These collections have great potential for research, education, and exhibition, and this value is increased when they contain images supplied by news agencies (such as AP, UPI, and others), as is frequently the case. The author surveyed photo morgue collections in 55 libraries, archives, and museums, and collected data on the inclusion of news agency photographs as well as the extent, date range, arrangement, description, accessibility, and rights and reproduction policies. The survey data and the data collected during physical assessment at 10 repositories indicate that the presence of news agency photographs, which in some cases account for the majority of a morgue’s contents, adds to the challenge of managing the collections. This is due largely to the retention of copyright by the agencies or other third parties, and the unstable (and varied) print technologies frequently used to produce the images. This article describes obstacles to preservation and access and details current efforts to render these significant visual resources available to users. Appendixes provide information about facsimile prints as well as specific recommendations for storage and housing of newspaper photo morgue collections.

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KEY WORDS

Preservation, Collection management, Photographs, News agency photographs

The American newspaper industry has experienced significant contraction since the last quarter of the twentieth century. Between 1981 and 2014, the number of daily newspapers published in the United States decreased by over 25 percent. In the last ten years, the rate of decline nearly doubled, with 217 newspapers, most of them local, shutting down.¹ As newspapers close, their “photo morgues” (collections of photographs produced over the years by staff, freelance, and news agency photographers) often become available for acquisition by libraries, archives, and museums.

These collections, which may contain a million items or more, some dating back to the 1890s, are rich troves of cultural and historical information. They are prized by a wide range of communities, from academic research library users to local history enthusiasts and genealogists. Repositories report high use when photo morgue collections are readily accessible, such as at the Library of Congress (LOC). Barbara Orbach Natanson, head of Reference Services for LOC’s Prints and Photographs Division, reported: “Historic news photographs offer an immediacy and perspective on past events that make them among the most popularly requested items in our collections.”²

Newspaper photo morgues, however, present a particular set of collection management challenges. Some of these have to do with the collections’ large size and original organization. Other challenges derive from copyright and print formats unique to news agency photographs. In contrast to photographs produced by newspaper staff photographers, newspapers do not own copyright for news agency photographs, the agencies themselves do, particularly the Associated Press (AP) and Corbis. Finally, many of the print technologies used in the latter twentieth century to distribute news agency images are unstable, especially compared to gelatin silver black-and-white photography, the dominant medium for newspaper staff photography throughout the twentieth century. This article details these challenges, particularly in the areas of preservation, storage, accessibility, and rights/reproduction, and describes current practices for managing photo morgue collections in libraries, archives, and museums. (Preservation recommendations informed by the collected data are presented in the appendixes.) The article also identifies areas where further research and advocacy are needed.

Historical Background

Newspapers began to incorporate photographic images soon after the development of photography in the mid-nineteenth century. However, photos published in newspapers were barely legible until newspapers adopted the half-tone reproduction process in the 1890s.³ Immediate consumer demand for news photographs created a robust market and because only the largest newspapers

could afford to set up and staff in-house photography departments, news agencies established photo services to meet the demand. Five news agency photo services were established in the United States between 1914 and 1928. By 1960, the two largest, United Press/United Press International (UP/UPI) and the Associated Press (AP) had subsumed their early competitors and dominated the American market for news photographs.⁴

As newspapers acquired photographs from staff photographers and news agencies, as well as other third parties, they set up archives called “photo morgues” to manage these assets.⁵ Newspapers generally maintained separate negative and print photo morgues. The negatives were exclusively produced by staff photographers, as news agencies or other third parties retained the negatives of their images along with the copyright. A photographic print or negative, if deemed valuable by the newspaper for future use, was prepared for filing in the newspaper’s photo morgue. Filing processes varied among newspapers, but for the most part, photographic prints, or the sleeves holding negatives, were stamped and/or marked with notations or attachments (i.e., paper clippings) that communicated filing, copyright, production, and publication information.⁶ News agency prints are easily identifiable either by stamps (e.g., “AP,” “UPI”) and/or accompanying captions printed on a variety of papers, adhered to the prints, or integrated into the image. Photographic prints selected for publication were typically altered during the reproduction process. These alterations, made with a variety of media (e.g., color pencils, inks, graphite, wax crayon), may denote cropping and sizing information, provide guidance for image readability, and/or emphasize particular features of an image.

The formats deposited in photo morgues reflect the dominant and available technology of successive time periods. Deposits made during the nineteenth and early twentieth centuries include glass negatives, albumen prints, and tin types, whereas the bulk of the negatives in photo morgues from the mid-twentieth century onward are 35mm polyester-based negatives and transparencies, gelatin silver developed-out prints, chromogenic prints, and facsimile prints. Today, additions to active newspaper photo morgues are overwhelmingly digital files rather than prints.

In the first few decades of news photography, the news agencies physically distributed photographs from their bureaus.⁷ In the quest to get their photos to the newspapers ahead of the competition, photographers and news agency staff creatively exploited all modes of transportation, including charter planes, trains, motorcycles, speedboats, and carrier pigeons, to transport negatives to the bureau offices and, subsequently, prints to the newspapers. The advent of the telegraph, telephone, and radio meant that such feats were no longer necessary. Henceforth, fierce competition among news agencies acted

as a powerful spur to technological change, as agencies sought ever speedier ways to transmit their photographs to the newspapers. Jonathan Coopersmith described this competition, and the development of the first wireless system, AP's Wirephoto, in his article, "From Lemons to Lemonade: The Development of AP Wirephoto."⁸

Wirephoto (and its early competitors) operated by scanning photographic images and translating the different areas of image density into audio tones; these were then transmitted to receiver equipment and converted into variable light that exposed a gelatin silver-based photographic support. The gelatin silver photographs were then processed in the darkroom of the receiving institution (a newspaper or news agency bureau office) via a wet, multistep process to reveal an image. Until the development of facsimile printing in the mid-1950s, all press agency photographs, regardless of how they were transmitted, were gelatin silver black-and-white photographs.

To speed up the development of gelatin silver photographs, news agency and newspaper photographers sometimes chose not to fully process the images, resulting in "improperly processed" prints (see Figure 1). To accelerate processing, it is also likely that many news agencies and newspapers used time-saving stabilization processes. In his manual on copying processes, Ian Batterham outlined the development of stabilizing processes; the history, identification, and preservation issues are the topic of Erin Murphy's research article, "XRF Identification of 20th Century Developer-Incorporated Stabilized Prints."⁹

Newspapers in the United States began to regularly receive nonsilver photographic images over wires after 1954, when both UP and AP introduced nonsilver electrolytic printing systems. The new systems, Unifax and Photofax, respectively, were based on Alexander Bain's concept for a facsimile printer, patented in 1843.¹⁰ The new systems delivered positive images that were ready for press, a time-saving advantage over gelatin silver prints, which require processing. While the production of electrolytic prints was faster, the image quality and permanence was inferior to gelatin silver photographs. Margaret Wessling outlined the history and development of electrolytic facsimile systems in her technical investigation on the composition and preservation of Unifax prints, "Characterizing United Press International's Unifax Facsimile Prints."¹¹ Wessling defined the images produced by the Unifax and Photofax facsimile systems as "printed on a partially translucent paper support" and "monochromatic in a range of warm brown densities."¹² Wessling also described the lack of detail in the high-density image areas and called attention to the phenomenon of "ghost images" produced by the print on adjacent materials (see Figure 2).¹³

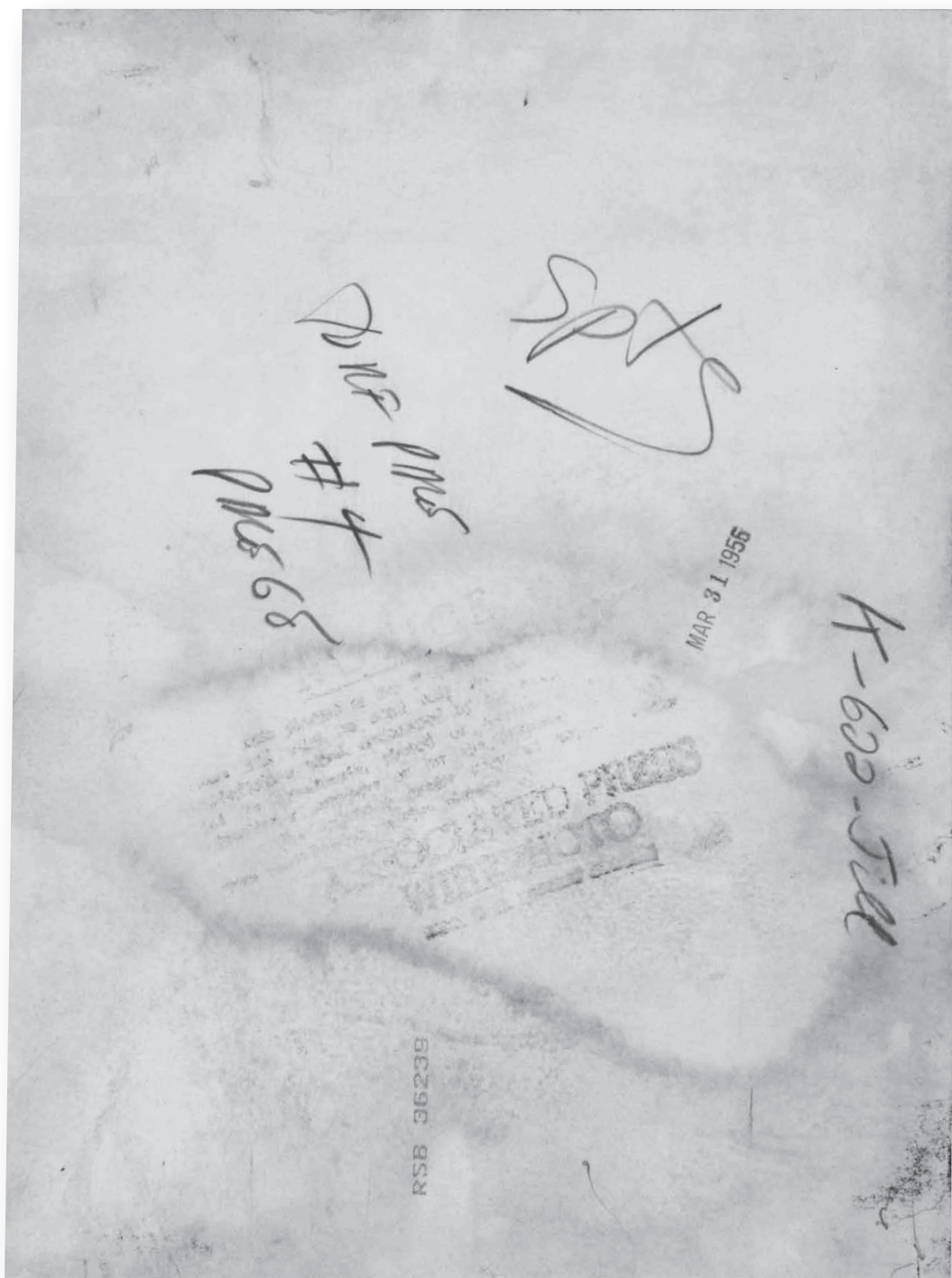


FIGURE 1. Verso of a news agency print from the author's collection. Note areas of irregular staining and discoloration that are characteristic of poorly processed prints.

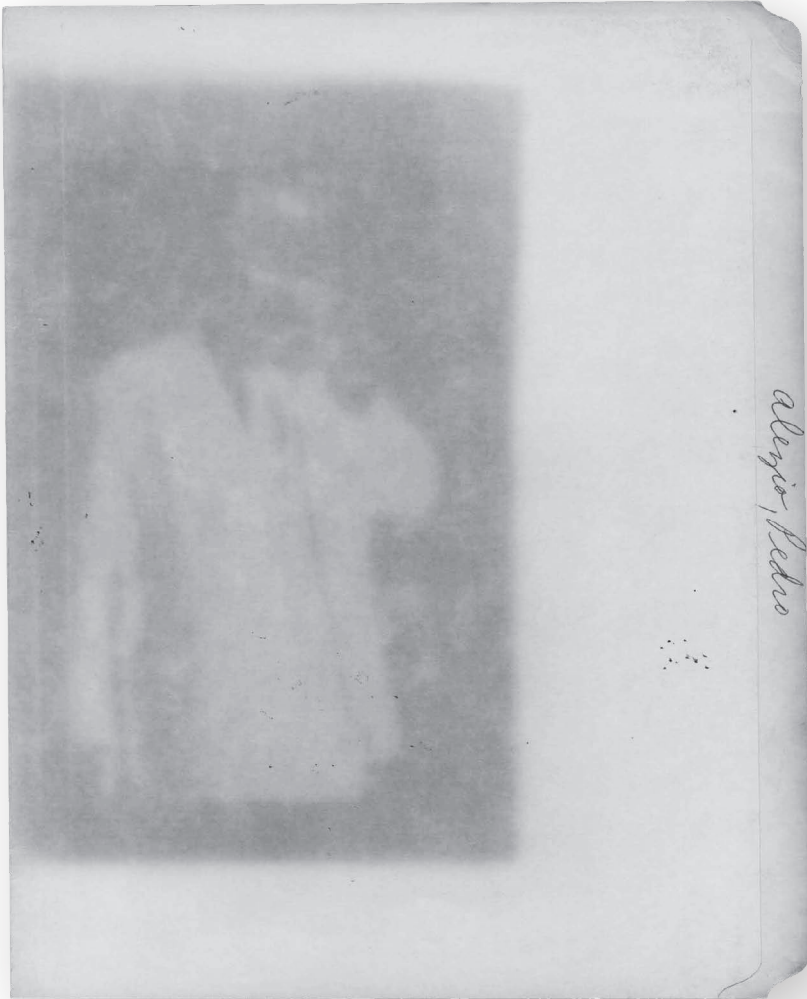


FIGURE 2. The original folder from the *Daily Worker* and *Daily World* Photograph Collection shows a distinctive “ghost image” from an electrolytic facsimile print stored within the folder.

Far from every photo morgue collection with news agency prints contains electrolytic facsimile prints, as neither Unifax nor Photofax completely replaced gelatin silver print receivers, which were not phased out entirely until the mid-1970s with the introduction of two new print systems, AP’s Laserphoto and UPI’s Unifax II. Introduced in the December 1974 issue of *AP World*,¹⁴ Laserphoto is described as a dry thermal silver process that will replace both the “Photofax electrolytic facsimile” and the “wet chemical print.”¹⁵ Laserphoto images are touted as “a quantum improvement over Photofax prints” due to “the sharpness of detail and range of tones.”¹⁶ The ease of handling and maintenance is also stressed, no processing chemicals being required. Laserphoto and other types of thermally processed silver materials (TPSM), first produced in the 1960s, are

by design sensitive to light and heat, a characteristic with obvious implications for preservation.¹⁷

Unifax II utilized electrostatic copying technology to produce a chemically stable print with tonal variation. On a website dedicated to UPI, engineer David R. Spenser, who led development of Unifax II, wrote that the electrostatic technology was “appealing because of its relative stability over temperature, humidity, and atmospheric pressure variations.”¹⁸ The system used liquid toner and, according to Spenser, produced “better and more stable image quality” than did AP’s Laserphoto system, although he conceded that Laserphoto “offered machine simplicity,” as it was a dry medium.¹⁹ Information on facsimile processes commonly used by U.S.-based news agencies is found in Appendix A, while specific preservation issues and recommendations for the type of prints most frequently found in newspaper photograph morgues (according to the data I collected) are presented in Appendix B.

After facsimiles, the next format of news images, the digital file, transformed journalism, as Internet news providers published images upon receipt from news agencies and many other sources. At the same time, the shift from print to online undermined the traditional business model of the newspaper industry, which depended heavily on subscriptions, advertising, and listings. As print circulation plummeted and revenues dried up, a large number of newspapers closed, a trend likely to continue for some years. Some surviving newspapers transitioned their photo morgues to digital format and relinquished their physical morgues to save money on storage. The effect of these developments has been to increase the number of print photograph morgues available for acquisition by libraries, archives, and museums.

Literature Review

While many publications document the history of newspaper photographs and news agency photography, only one focuses on the management of newspaper photo morgue collections: Jennifer Hain Teper’s 2004 research article, “Newspaper Photo Morgues—A Survey of Institutional Holdings and Practices.”²⁰ Hain Teper compiled data by surveying institutions with photo morgue collections, particularly collections of negatives, about acquisition and management issues. The article does not address issues relating specifically to news agency photographs. The majority of the surveyed repositories acquired their newspaper photo morgue collections in the 1970s and 1980s, a fact that Hain Teper attributed to a surge in newspaper closures during this period. Writing in 2004, Hain Teper predicted an imminent further wave of acquisitions of newspaper photo morgue collections by cultural institutions due to the emergence and growing dominance of digital media. According to Hain Teper the space

demands of these (generally very large) collections (41% of which reported over a million items) would pressure newspapers to relinquish their physical photo morgues in favor of digital archives.

Hain Teper's survey data indicated that processing a photo morgue collection is often a resource-demanding endeavor. Only 25% of the surveyed collections were fully processed, and processing time ranged from 4 to 29 years. Collections receiving federal or private grant funds were more likely to be fully processed: "If no outside funding is available, institutions are frequently left languishing with partially processed collections or processing projects that may take over a quarter of a century."²¹

The usage data presented by Hain Teper indicates that newspaper photo morgue collections are heavily used, with some surveyed repositories reporting daily use. Heavy use persisted despite the fact that the vast majority of the collections surveyed were not fully processed and that repositories "did very little to promote their holdings." Hain Teper noted that photo morgues "serve as an excellent source of photographic evidence of the many historical, cultural, and industrial changes that have shaped individual communities and the nation,"²² and attributed high usage to a combination of factors, including the "high local relevance of the subject matter and the visual format of the collections."²³

CASE STUDY: DAILY WORKER AND DAILY WORLD PHOTOGRAPH COLLECTION

I learned firsthand about the challenges of managing a newspaper photo morgue collection when the Tamiment Library and Robert F. Wagner Labor Archives of New York University (NYU) Libraries acquired the *Daily Worker* and *Daily World* Photograph Collection from the Communist Party of the USA archives and the Library of the Reference Center for Marxist Studies. The *Daily Worker* newspaper was founded in 1919 as the official organ of the Communist Party USA.²⁴ Its circulation peaked at approximately 35,000 in the late 1930s. With the rise of anticommunism in the United States in the 1950s, circulation plummeted, and the paper was closed from 1958 until 1960, when it was reintroduced as a biweekly publication. In 1967, the newspaper resumed daily publication, continuing until 1991, when it switched to weekly publication, under the name *People's Weekly World*. After another title change to *People's World* in 2009, the newspaper ceased printing and became an electronic-only publication in 2010.

The large photo morgue (263 linear feet after processing) served the newspaper from 1920 to 2001. It contains a wide range of photographic materials, including 36 linear feet of negatives and a large number of facsimile prints and a variety of gelatin silver prints. With reference to the many processes found in the morgue, the authors of the collection's finding aid stated: "The different print formats present in the collection document the history of newspaper

printing technologies, and the changing ways in which news services distributed images for publication. In addition, they reveal the process of the *Daily Worker* and *Daily World* image-making by documenting the collecting of images for publication, as well as the ways in which images were cropped, sized and captioned before being published in the paper.”²⁵

While conducting a survey in 2009 to plan the physical care for the collection, I encountered a wide variety of news agency prints, accounting for roughly half of the print collection. The majority of the news agency prints are from UPI up to the 1990s, when that agency entered a decline; thereafter, the newspaper began to receive large numbers of AP images. In addition to UPI and AP images, the collection contains hundreds of prints from other, non-U.S. news agencies including Sovfoto, TASS, ADN (for East Germany), and Japan Press Service. While the early news agency prints were gelatin silver photographs, those from the mid-1950s to the 1990s were printed using the three different facsimile processes with a range of preservation issues, from dramatic fading to the offsetting of dense image areas onto adjacent materials. While the majority of the print processes in the collection could be identified by examining the prints, consulting manuals on print reproduction processes, and seeking assistance from photograph conservators and archivists, the identification of the facsimile printing process used to create UPI prints from the mid-1950s to the 1970s required further investigation.²⁶ Margaret Wessling, who from 2011 to 2013 was a graduate student at the Institute of Fine Art Conservation Center and a colleague in the Barbara Goldsmith Book and Paper Conservation Laboratory of NYU Libraries, successfully identified the facsimile process as electrolytic by studying patent applications and conducting analytical research.²⁷ The information gathered on the facsimile processes informed the preservation plan for the *Daily Worker* and *Daily World* Photograph Collection and inspired further research on the distribution of news agency prints in other photo morgue collections. This research developed into the current study on collection management of photo morgue collections, specifically documenting the characteristics (size, date range, variety of formats, and current accessibility) of photo morgue collections as well as the distribution of news agency prints in these collections.

Methodology

Building upon Hain Teper’s research, I surveyed the repositories in the Library of Congress (LOC) Prints and Photographs Division’s list of *Newspaper Photograph Morgues* to compile collection management data, including information about news agency photographs.²⁸ When I began the survey in 2013, the LOC *Newspaper Photograph Morgues* list cited 58 heritage institutions distributed across 26 U.S. states with at least 1 newspaper photo morgue collection

in their holdings.²⁹ The repositories on the 2013 LOC list included 21 college and university libraries, 16 public libraries, 9 historical societies, 7 government agencies, 4 museums, and 1 independent archives, the Texas African American Photography (TAAP) archives. I compiled data on these collections' extent, date ranges, arrangement, accessibility, and rights and reproduction policies, as well as the inclusion of news agency or other third-party photographs using published finding aids, catalog records, and Web pages, as well as direct contact with repositories.³⁰

In addition to the survey, I conducted on-site physical assessments of photo morgue collections in 10 repositories.³¹ The goal of these physical assessments was to gather information about the different print technologies and particular news agency prints, and to document related preservation issues. I selected the repositories based on both location and the knowledge that the collections contained news agency photography. Five of the repositories were public libraries, three were university libraries and archives, and two were historical societies. The sampling technique I employed varied according to the descriptive data available, as well as reading room policies and the time available to view the photographs. Whenever possible, I used finding aids and other descriptive tools to select subjects that would most likely garner news agency photographic prints, particularly prints from the mid-1950s onward, when facsimile technologies were used.³² When a finding aid or other descriptive tool was not available, or when the bulk of the collection was not physically accessible to researchers, repository staff selected the sample.

Findings

In 2014, I compiled data on 75 newspaper photo morgue collections held in 55 of the 58 repositories (95%).³³ The distribution of surveyed collections is as follows: 40 repositories hold 1 collection; 10 hold 2; 3 hold 3; and 1 repository holds 4. Some collections include images from multiple newspapers, particularly in cases where newspapers merged. Also, 1 photo morgue, formed by the merging of the *San Francisco News* and the *Call Bulletin*, is dispersed among 3 different repositories.³⁴

While I was able to gather data on the date range, extent, and formats from all 75 photo morgue collections, information about arrangement, description, and accessibility of the collections was not always available, because processing was incomplete. Fifty-nine collections (79%) contain both prints and negatives, and sixteen are exclusively collections of negatives. Only 2 collections, from a single repository, reported the inclusion of digital image files. News agency prints are reported in 41 of 59 collections containing photographic prints (70%).

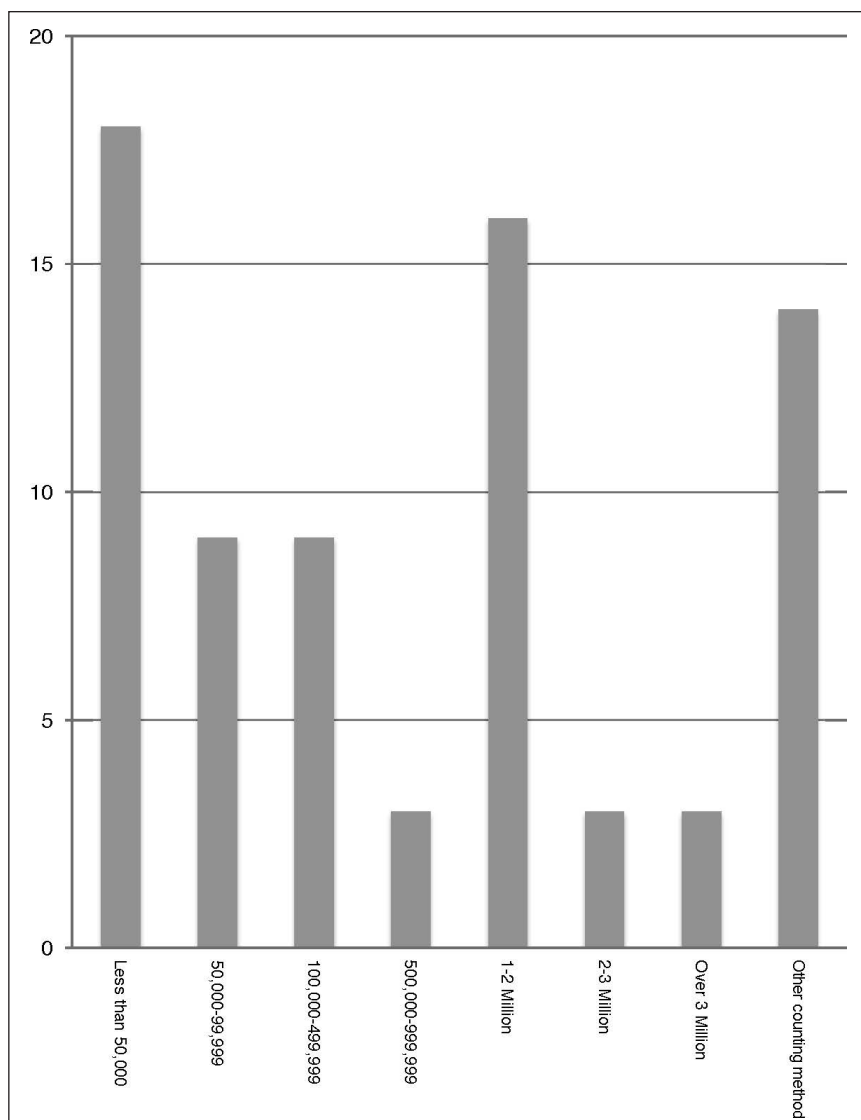


FIGURE 3. This bar graph shows the number of items reported in surveyed collections presented using Hain Teper's grouping.

Data on extent are presented in Figure 3 using the item-based counting method and groupings utilized by Hain Teper. While the majority of the collections with one million or more items contain news agency photographs (16 of 22), no clear relationship exists between extent and the inclusion of news agency prints, as more than half of the smallest collections also contain news agency photographs. The presence of news agency images is predicated on coverage of the newspaper, not the size of the photo morgue or the newspaper's circulation.³⁵

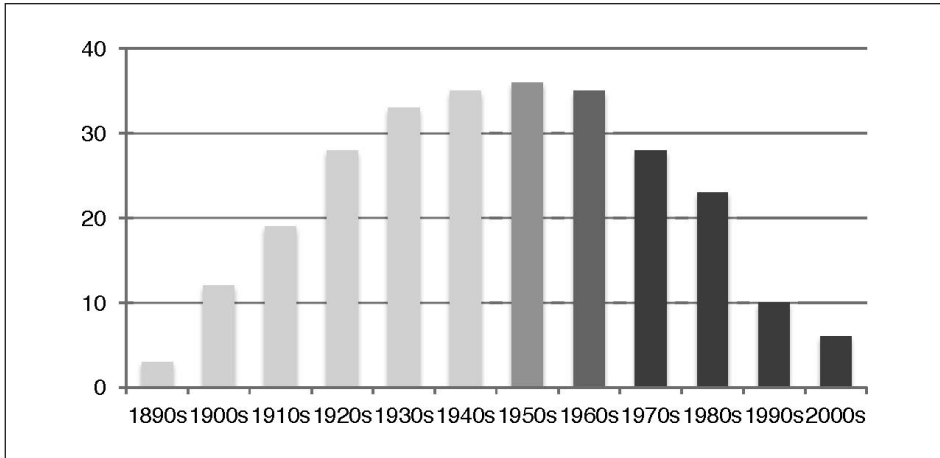


FIGURE 4. This bar graph reflects holdings by decades in collections containing news agency prints. The darker the columns, the more the likelihood of facsimile prints.

I utilized Hain Teper's methodology to analyze data collected on dates, as her method permits some assumptions to be made about the types of photographic processes most likely to be found in the collection and their associated preservation risks. As with Hain Teper's results, the survey data indicate concentrated holdings of photographs from the 1930s to the 1980s (see Figure 4). By filtering the data for only those collections that include news agency photographs, I identified the collections likely to contain facsimile prints. During the physical assessments, I discovered that date information is only an indication of the possibility of facsimile processes, as many newspapers did not immediately adopt facsimile printing systems.³⁶ The early adoption of facsimile technology cannot be predicted by the size of the newspaper; other uncertain influences are in play.³⁷ Additional assessment of samples from photo morgue collections is needed to document the distribution of news agency electrolytic facsimile prints.

Of the surveyed collections, 31 are arranged alphabetically by topical subjects and personal names; 13 are chronologically arranged; 13 are arranged both chronologically and by topic/name; 14 collections are arranged numerically; and 4 collections are arranged using other methods.³⁸ The collections arranged numerically are accessed through analog indexes, which required reference services in addition to those collections arranged by subject or date. I observed no relationship between the arrangement methodologies and whether the collections included news agency photographs. In addition to the primary arrangement scheme, at least 10 of the repositories arranged oversized materials separately.

The accessibility of a collection can be measured, at least in part, by the descriptive resources available and the contents of those resources. A finding aid or other descriptive resource, such as a library catalog record, a Web page, or index, was available for 62 of the 75 collections (83%), 50 of which were

accessible online. I evaluated the online descriptive resources for the following data elements as defined by *Describing Archives: A Content Standard (DACS)*: name and location of repository; title; date; extent; name of creator(s); scope and content; and conditions governing access.³⁹ Only 24 of the evaluated online descriptive resources (48%) contained these data elements (15 of which contain news agency photographs).

Rights and reproduction policy information available at the time of the survey is presented in Figure 5. Newspapers (or their parent corporations) retained all copyright for the images produced by staff photographers or other “work made for hire” (WFH) photographers for almost half of the collections. Two of the eight collections’ policies where partial copyright is maintained by a newspaper use a 25-year moving wall agreement to define rights. Unclear or undefined donor agreements inspired 7 repositories to claim and administer property rights for the WFH images in their collections. All the reviewed policies referred users directly to the copyright holder for permission to use or publish news agency and other third-party images. Occasionally, repositories provide contact information for news agencies or other third parties, such as local photography studios. However, most do not provide this information.

While usage data were not collected during the survey, I gathered some information through communications with repository staff. The limited information collected supports Hain Teper’s findings that photo morgue collections are frequently among the most used in a repository. A number of repositories

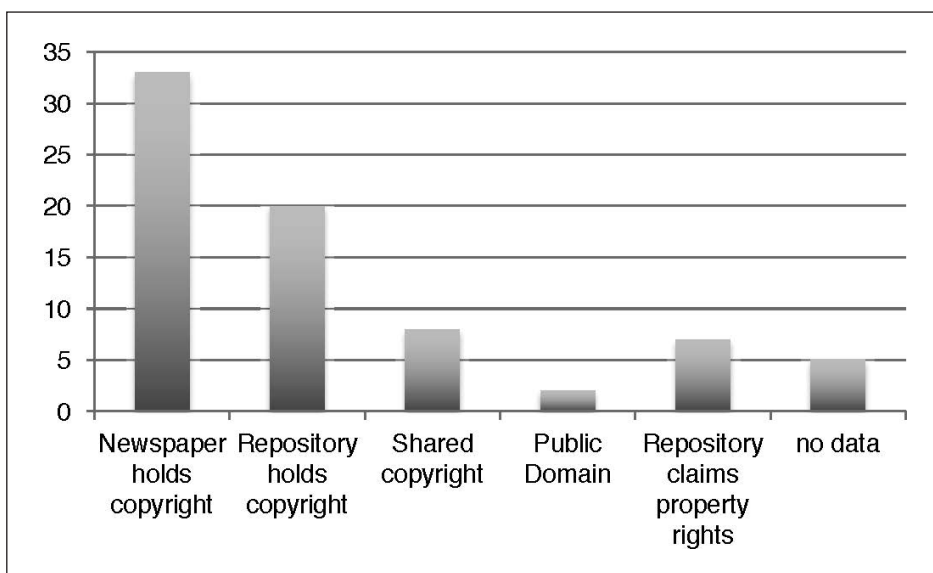


FIGURE 5. This graph represents the rights and reproduction policy information available at the time of the survey.

reported that their photo morgue collections are among those most requested.⁴⁰ Anecdotal information collected about the types of use suggests that photo morgue collections serve a diverse range of users including academic faculty and students; genealogists; local historians; journalists; historic preservationists; architects; school-age students; enthusiasts (i.e., train, military, ships); museum curators; and film/TV production researchers.

Discussion

The data collected in the survey and during the on-site assessments confirm Hain Teper's findings that managing newspaper photo morgue collections is complex and resource demanding, with the exception of very small and homogenous collections. The inclusion of news agency photographs introduces further challenges due to the retention of copyright by the news agencies (or, in some cases, other third parties) and the often-unstable print media. While demands for space and processing are not necessarily exclusive to collections with news agency prints, these burdens affect the accessibility of photo morgue collections in general and therefore warrant additional examination.

As the vast majority of photo morgue collections surveyed are neither small nor homogenous, the physical space required to store these collections is significant. Often they need to be stored in off-site facilities, resulting in a time lag between users' requests and access. Non-local researchers depend on online descriptive resources to select materials, and if no such resource is available (as is the case for the majority of the collections surveyed), reference staff is burdened with additional duties.

Some repositories may consider acquiring only a portion of a newspaper's photo morgue, such as the images pertaining to local history. I caution against this approach. The loss that occurs when photograph collections are broken or split is well documented.⁴¹ Likewise, aggressive "weeding" of national and international images to reduce the size of the morgue is not advised, as these photographs, including those provided by news agencies, are valuable documents revealing the distinctive ways in which a newspaper, and its community, perceived and interpreted nonlocal events. Preserving the entirety of a photo morgue collection is necessary to document comprehensively the newspaper and its community.

Moreover, while an image provided by a news agency may be duplicated in other collections, each print is unique, not solely because of the printing methodology, but also owing to the way in which the print was filed, marked, and prepared for publication. The classification and alteration of an image by a newspaper renders it a unique object, even in cases where the same image was provided to hundreds of newspapers. As Ricardo L. Punzalan stated in his article "Archival Diaspora: A Framework for Understanding the Complexities and Challenges of

Dispersed Photographic Collections,” “Uniqueness is often contextual and cannot be justified solely by rarity or an item’s status as ‘the one and only’ in the world.”⁴² The documentary value of a print is not limited to the original image; for example, physical evidence of the ways in which an image was altered in preparation for publication can provide insights into a publication’s social or political slant. The cropping and altering of an image, often recognized and reported in the digital era, was also widely practiced using analog methods. A 2015 exhibit at the Bronx Documentary Center in New York City displayed examples of photographs altered by publications in the postproduction process, including the infamous darkening of O. J. Simpson’s skin for the cover of *Time* magazine in 1995.⁴³

Broad access to photo morgue collections in their entirety is under threat as some newspapers, or more accurately their parent corporations or stockholders, seek to monetize these cultural assets. The company that owns *Jet Magazine*, Johnson Publishing, began the process of dispersing *Jet*’s photo morgue by selling selected images in an effort to raise revenue. Johnson’s CEO justified the dispersal of the iconic image collection by stating, “We really need to monetize that in order to ensure growth in our core businesses.”⁴⁴ Unfortunately, this mindset is not uncommon, as reflected in an incident recounted to me involving a large metropolitan newspaper that proposed that a library partner with a not-yet-identified “angel” donor provide the newspaper with a substantial sum in return for the deposit of the newspaper’s photograph morgue into the library’s collection. Clearly, the elevation of the commercial over the cultural is a serious threat to the preservation and accessibility of newspaper photo morgue collections. Continued “monetization” of photo morgues will result in scattered and disassociated images and/or limit the acquisition of whole collections to only very well-funded institutions.

Other challenges are the high cost of preserving photo morgue collections and making them accessible. During my on-site assessments, I observed a wide range of processing strategies, from item level to minimal, and an inverse relationship between processing intensity and completion of processing.⁴⁵ It is important to note that the minimal descriptive strategies successfully used in some of the surveyed repositories are not applicable to other collections due to their original arrangement schemes. Processing efficiency increases when the original arrangement of a photo morgue is alphabetical by topic or names. Processing a photo morgue collection originally organized by a complex index system is a more resource-demanding undertaking, as these index systems, typically managed through massive card catalogs, are not easily accessible to users, particularly remote users, and folders and boxes in these collections are titled with codes rather than subjects, names, or dates. Manual conversion of analog indexes into online descriptive tools is a far more resource-demanding task than generating folder lists for collections arranged alphabetically by topic or name. Digital tools,

such as OCR, which continues to be developed and refined, may offer technological solutions to transforming these analog indexes and increasing accessibility.

Housing strategies applied to the assessed collections generally reflect description intensity. The strategies ranged from item-level housing to no preservation actions at all, and many approaches in between. All the collections assessed require researchers to use gloves to prevent damage from fingerprints.⁴⁶ The collections processed at the most minimal level are stored in record boxes in old folders/envelopes or loose in the boxes. Collections processed at the folder level are usually housed in sturdy archival boxes, and selected folders had been replaced with acid-free folders or envelopes. While the very minimally processed collections were available, I found these collections very difficult to use. To locate requested subjects, I had to manually sort through a large quantity of photographs; in doing so, I observed significant handling damage.

News agency prints are usually stored in folders, envelopes, or loose in a box with photographs on the same topic or person. The segregation of prints by process can improve preservation of the collection by ensuring that unstable processes do not damage other processes. For the *Daily Worker* and the *Daily World* Photograph Collection, the electrolytic facsimile prints and stabilized or poorly processed prints are stored in separate folders by process. This pragmatic housing method promotes the overall preservation of the collection, but it does not address the long-term preservation needs of the individual prints, which would require individual housing, a resource-demanding endeavor. Specific recommendations for each type of print most commonly found in newspaper photograph morgue collections (according to the data I collected during the on-site assessments) are presented in Appendix B.

The recommendations presented in Appendix B should be consulted to make informed preservation decisions and to understand preservation risks. By consulting Appendix B, repository staff for a large photograph morgue collection stored at room temperature can identify which prints in the collection are at the greatest risk in that environment (i.e., chromogenic prints) and either take steps to mitigate the risk, such as transferring the vulnerable prints to cold storage, or accept the risk that the storage room temperature will result in the image loss. The recommendations in Appendix B are format specific, while Appendix C provides general preservation guidelines for newspaper photograph morgue print collections. The information in Appendix C is presented in a benchmark format adopted from the Collection Trust's "Benchmarks in Collection Care."⁴⁷ The "Basic" level defines the minimal activities repositories must implement to be responsible collection stewards. The next level, "Good," is achievable by most repositories, and the highest level, "Best," describes the ideal for long-term preservation and access. Use of a collection should guide preservation activities, and, when resources are limited, an iterative approach is

encouraged. For example, my colleagues and I are currently planning to improve the housing of the *Daily Worker* and *Daily World* Photograph Collection because it is one of the most heavily used in the repository. We are replacing the “good” archival records storage boxes with “best” archival half-sized record storage boxes. The result will be a collection housed in smaller and lighter boxes, reducing risks to both the collection and the paging staff.

Both Appendixes B and C provide environmental recommendations. While the recommendations in Appendix B are format specific, the benchmarked recommendations in Appendix C assume a mixed collection. Most photographic materials and some facsimile prints are extremely vulnerable to high temperatures and unstable relative humidity. Cold storage, particularly for mixed collections, may be the best preservation strategy, but, in addition to requiring significant resources, cold storage requires a time lag for materials to acclimate to a reading room environment that is rarely practical for heavily used collections.⁴⁸ Cool storage is a more realistic goal for heavily used photo morgue collections as the acclimation time would be much shorter and the collections would benefit from the lower controlled temperature.⁴⁹ Digitization of photo morgue collections could facilitate long-term lower temperature storage by creating surrogates for use. Regrettably, however, the intellectual property issues presented by news agency and other third-party images impede comprehensive digitization of most photo morgue collections. Some repositories are digitizing only those images in their collections for which they have copyright, omitting third-party images. While this strategy improves access to a portion of the collection, it is not satisfactory, as the resulting digital collection is incomplete without the important visual and textual resources provided by news agency and other third-party images. Collaborative agreements between news agencies and repositories and/or an expansion of the current fair use provision are necessary for repositories to pursue digitization to improve access and promote long-term preservation.

While only one of the surveyed repositories contains digital images in its newspaper photo morgue collection, most new acquisitions of newspaper photo morgues will include digital image files stored in a variety of media. Digital files have replaced both facsimile prints and traditional gelatin silver photographs in the newspaper industry. Caring for these image files demands a different set of protocols, procedures, and expertise from those for analog collections. Large digital collections, like large analog collections, require significant resources to ensure their ongoing care and accessibility. Concerns about preservation and continuing accessibility of digital news inspired the creation of the collaborative initiative, *savenews.org*, which is working to promote sustainable models for news preservation and to build a network for advocacy.⁵⁰ Additional research is needed to document digital newspaper photo morgues and to develop a framework to facilitate their acquisition, preservation, and continued accessibility.

Conclusion

Newspaper photo morgue collections with news agency prints are valuable cultural resources that frequently challenge collection management in libraries, archives, and museums. Those challenges derive from the collections' size and original organization, the retention of copyright by news agencies (and other third parties), and the unstable print technologies and processes frequently used to produce news agency images. The effect of these challenges all too frequently is that access to collections or parts of collections is limited, particularly to those collections where the original organization did not easily facilitate baseline processing. While size, organization, print composition, and copyright can impede repositories from making a collection accessible, a lack of resources is the greatest obstacle.

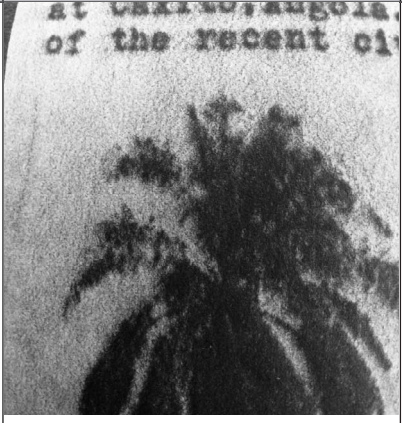
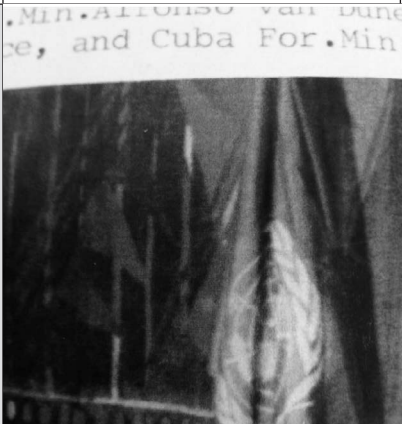
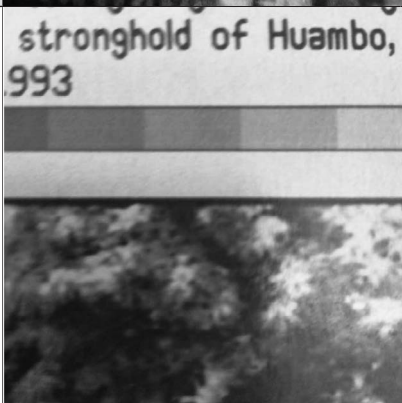
In response to the varying levels of resources available to repositories with photo morgue collections and the documented struggle to preserve them, I developed the preservation benchmarks found in Appendix C. By establishing benchmarks, all repositories, regardless of their resources, can plan both short-term and long-term preservation activities. A repository that is unable to meet the minimum level should not pursue the acquisition of a newspaper photo morgue collection, because if the minimum standard is unmet, continued preservation and access are not supported.

Public libraries, where the use of photo morgue collections is greatest, experience the struggle to preserve and provide access to them most acutely. During site visits to public libraries, I repeatedly heard that the lack of resources for processing, let alone digitization, is the major obstacle to managing photo morgue collections. I also observed heavy use of photo morgue collections (I was rarely the sole user of the collections during my visits). The financial struggles of public libraries are well documented, as is the increasing demand by their users.⁵¹ Some of the public libraries I visited rely on interns and volunteers for processing, as they do not have funding for staff, let alone collection management systems that would facilitate processing. Increased collaboration between different heritage institutions will result in an overall increase in the accessibility of collections, benefiting all users.

Specific documentation on the different user communities accessing newspaper photograph morgue collections, including differing types of usage and user experience, would demonstrate to potential funders the value of making these collections accessible. Such documentation should be used to inform descriptive practices, define digitization projects, and promote policies and procedures that would enable broader accessibility. Understanding use and users, together with the information presented in this article, will provide the data needed to build advocacy networks and define sustainable collection management activities, both of which are needed to promote preservation and improved accessibility to these valuable cultural and historical resources.

Appendix A

Description of U.S. News Agency Facsimile Prints⁵²

Facsimile Process (Dates) Brand Name (USA)	Image	Features
Electrolytic Facsimile Prints (1954–1970s) <i>Unifax</i> <i>Photofax</i>		<ul style="list-style-type: none"> -Translucent support -Warm brown media -Media offsets onto adjacent materials. -Loss of detail in dense areas -Paper fibers visible
Electrostatic prints (1974–2000s) <i>Unifax II</i>		<ul style="list-style-type: none"> -Slick white paper support -Tone ranges from white to mid-black. -Surface easily scratched -Paper fibers not visible
Thermal Processed Silver Materials (1974–2000s) <i>Laserphoto</i>		<ul style="list-style-type: none"> -Heavy slick paper -Support verso bright white -Tone varies from browns to shades of gray. -Edges of prints often darker -Loss of detail in less dense areas

Appendix B

Preservation Concerns and Recommendations for Newspaper Photograph Morgue Prints⁵³

Print Process	Gelatin silver prints	Gelatin silver stabilized and poorly processed prints	Electrolytic facsimile prints	Electrostatic prints	Thermally processed silver materials	Chromogenic prints
Frequency in Survey	Always	Often	Sometimes	Often	Often	Rarely
Dates	1890s–2000s	1940s–2000s	1954–1970s	1974–2000s	1974–2000s	1940s–2000s
Sensitivities	RH ⁵⁴ ; Temperature; Light	RH; Temperature; Light	Moisture	Abrasion; Heat and pressure; Plasticizers	RH; Light; Heat	RH; Temperature; Light
Other Concerns		May discolor adjacent prints	Will discolor adjacent prints			
Environmental Recommendations ⁵⁵	ROOM	COOL or COLD	ROOM	ROOM	ROOM or COOL	COLD or FROZEN
Storage Materials	PAT passed	PAT passed	Acid-free, lignin-free, or PAT passed	Acid-free, lignin-free or PAT passed. Use rigid polyester for individual sleeves.	PAT passed	PAT passed
Segregate from Other Prints		Yes	Yes			

Appendix C

Preservation Benchmark for Newspaper Photograph Morgue Collections⁵⁶

	Basic	Good	Best
Environment Goals	Moderate (68F) +/- 5 degrees RH ⁵⁷ : 25%–55%	Moderate temperature (68F) +/-3 degrees RH: 30%–50%	Cool (54F) or Cold (40F) RH: 30%–50%
Environmental Monitoring	Temperature and RH reading taken weekly in storage areas	Continuous monitoring of temperature and RH in storage areas	Continuous monitoring of temperature and RH using multiple devices in each storage area
Storage Furniture	Material is at least 2 inches off the floor. Shelving is braced and accommodates the size and weight of collection.	Basic recommendations; plus: all items are stored in archival quality boxes on steel powder-coated shelving.	Good recommendations; plus: storage furniture and room materials are tested for reactive compounds.
Storage Materials: Boxes	Boxes are sturdy. Any damaged boxes are replaced with acid-free, lignin-free boxes.	All boxes are acid free and lignin free.	All boxes are PAT passed and are 6 inches in depth or less.
Storage Materials: Folders	A maximum of ½ inch of photographs per folder. Damaged or brittle folders are replaced with acid-free, lignin-free folders.	All folders are acid free and lignin free with a maximum of ¾ inch of photographs per folder. Unstable print processes are stored in separate folders.	All folders are PAT ⁵⁸ passed with a maximum of ¼ inch of photographs per folder. Unstable prints processes are stored in separate folders.
Storage Materials: Individual Enclosures	Fragile and frequently used photographs are housed in PAT passed polyester sleeves.	Basic recommendations, plus unstable prints are stored in PAT test paper enclosures.	All prints are housed in individual enclosures.

Appendix D

SAMPLE EMAIL MESSAGE

Dear [Repository name],

I am researching the history, characterization, and preservation of newspaper photo morgues.

According to the Library of Congress the [repository name] holds the photo morgue [collection name]. I am very interested in learning more about the collection. Can you provide me with collection information? Or a link to a finding aid(s)? I am gathering information about whether the morgue contains prints or negatives, the date range, the size of the collection, and rights and reproduction information.

I am also very interested to know if the collection contains prints produced by press agencies (or leased press agency machines), which after the 1950s are often types of facsimile prints. I have attached a pdf example of press agency prints for your reference (the first three prints are examples of facsimile prints, the final print is a gelatin silver print from a press agency).

If you need additional information about my research request, please let me know.

Sincerely,

Laura McCann, Conservation Librarian
NYU Libraries

NOTES

- ¹ “Newspaper Circulation, Last Updated March 30, 2015,” Newspaper Association of America, <http://www.naa.org/Trends-and-Numbers/Circulation-Volume/Newspaper-Circulation-Volume.aspx>.
- ² Barbara Orbach Natanson, “New Resources List: Newspaper Photograph Morgues,” *Picture This* (blog), Library of Congress, November 2011, <http://blogs.loc.gov/picturethis/2011/11/>.
- ³ Halftone printing employs screens in the reproduction process to translate the continuous tone of a photograph into dots of various sizes. For technical information on halftone printing see the Getty Conservation Institute, *The Atlas of Analytical Signatures of Photographic Processes: Halftone* (Los Angeles: J. Paul Getty Trust, 2013), http://www.getty.edu/conservation/publications_resources/pdf_publications/pdf_atlas_halftone.pdf.
- ⁴ Richard M. Harnett and Bill G. Ferguson, *UniPress: United Press International, Covering the 20th Century* (Golden, Colo.: Fulcrum Publishing, 2003), chap. 23; William Hannigan and Ken Johnston, *Picture Machine: The Rise of American Newspictures* (New York: Harry N. Abrams, Inc., 2004), 7–19; Gary Haynes, *Picture This! The Inside Story and Classic Photos of UPI Newspictures* (New York: Bulfinch Press, 2006), 11–27; *20 Years with AP Wirephoto* (New York: The Associated Press, 1955).
- ⁵ The term “photo morgue” is usually attributed to an extension of the concept of “dead news.” Once a particular news cycle ends, the photographs are archived, or in the parlance of newspapers, sent to the morgue. An alternative explanation contends that the usage derives from the newspaper clipping files that were used to create quick copy for obituaries. These clippings from newspapers form an archive (morgue) that is usually housed in the same facility as the photographic files. Some newspapers, particularly smaller newspapers, filed clippings and photographs together.
- ⁶ A window into the practices that govern an active newspaper photo morgue is the popular blog *The Lively Morgue* and the video *Inside the Lively Morgue*. *The Lively Morgue* (blog), *The New York Times*, <http://livelymorgue.tumblr.com/>. Jessica Bennett, *Inside the New York Times Lively Morgue*, Tumblr TV, 4:23, May 8, 2012, https://www.youtube.com/watch?v=_9oijL5yUoQ. These resources describe the history of the *New York Times* photo morgue. The video addresses the past practice of weeding the photo morgue to make room for new deposits, which was common practice by many newspapers.
- ⁷ These earlier news agency photographs are identifiable by the captions that are adhered directly to the print.
- ⁸ Jonathan Coopersmith, “From Lemons to Lemonade: The Development of AP Wirephoto,” *American Journalism* 17, no. 4 (2000): 55–72.
- ⁹ Ian Batterham, *The Office Copying Revolution: History, Identification and Preservation. A Manual for Conservators, Archivists, Librarians and Forensic Document Examiners* (Canberra: National Archives of Australia, 2008), 90–92; Erin Murphy, “XRF Identification of 20th Century Developer-Incorporated Stabilized Prints,” *Topics in Photographic Preservation* 13 (2009): 100–109.
- ¹⁰ Margaret Wessling, “Characterizing United Press International’s Unifax Facsimile Prints,” *Topics in Photographic Preservation* 15 (2013): 179–89.
- ¹¹ Wessling, “Characterizing United Press International’s Unifax Facsimile Prints,” 179–89.
- ¹² Wessling, “Characterizing United Press International’s Unifax Facsimile Prints,” 181.
- ¹³ Wessling, “Characterizing United Press International’s Unifax Facsimile Prints,” 181.
- ¹⁴ “Laserphoto Arrives,” *AP World* (December 1974): 1–10.
- ¹⁵ “Laserphoto Arrives,” 1–5.
- ¹⁶ “Laserphoto Arrives,” 5.
- ¹⁷ Batterham, *The Office Copying Revolution*, 105–6; Gawain Weaver, email message to author, September 29–30, 2009.
- ¹⁸ David R. Spencer, “Development of the Unifax II NewsPicture Receiver—a Personal Story,” *The Downhold Project* (blog), October 2008, <http://downholdproject.centraldesktop.com>.
- ¹⁹ Spencer, “Development of the Unifax II NewsPicture Receiver.”
- ²⁰ Jennifer Hain Teper, “Newspaper Photo Morgues—A Survey of Institutional Holdings and Practices,” *Library Collections, Acquisitions, and Technical Services* 28 (2004): 106–25.
- ²¹ Hain Teper, “Newspaper Photo Morgues,” 117. Data on intensity of processing, which is certainly another contributing factor to completion of processing, was not reported in the survey.

- ²² Hain Teper, "Newspaper Photo Morgues," 107.
- ²³ Hain Teper, "Newspaper Photo Morgues," 121.
- ²⁴ Hillel Arnold, Erika Gottfried, and Michael Nash, *Guide to the Daily Worker and Daily World Photograph Collection Photos 223* (New York: Tamiment Library and Robert F. Wagner Labor Archive, 2014), http://dlib.nyu.edu/findingaids/html/tamwag/photos_223/.
- ²⁵ Arnold, Gottfried, and Nash, "Historical/Biographical Note."
- ²⁶ I would like to acknowledge the following individuals whose collaborations and/or assistance were essential to the project: Hillel Arnold, Jennifer Hain Teper, Erin Murphy, and Margaret Wessling. I am also grateful to Gawain Weaver for the information he provided on AP Laserphotos.
- ²⁷ Margaret Marie Wessling, *Wire Transfer Facsimile Prints in the Metropolitan Museum of Art's Photography Collection* (master's thesis, Institute of Fine Arts, New York University, May 2014), 1–47.
- ²⁸ "Newspaper Photograph Morgues," Library of Congress Prints and Photographs Division, <https://www.loc.gov/rr/print/resource/newsmorgues.html>.
- ²⁹ This wide distribution reflects the practice of depositing newspaper photo morgues in geographically proximate repositories, although some exceptions exist, such as the New York Journal-American Newspaper Photo Morgue that is part of the Harry Ransom Center–University of Texas at Austin.
- ³⁰ When data was not discoverable through online descriptive tools, I contacted the collection institution via email, Web-form, phone, and in-person interviews with collection staff (see Appendix D: Sample Email Message). The collected data was recorded in an MS Excel spreadsheet and analyzed.
- ³¹ The repositories visited were Brooklyn Public Library; D.C. Public Library Special Collections; Indiana Historical Society; Los Angeles Public Library; Minnesota Historical Society; New York University Tamiment Library and Robert F. Wagner Labor Archives; Queen Borough Public Library Archives; San Francisco Public Library, San Francisco History Center; UCLA Library Special Collections; University of Southern California Library Special Collections.
- ³² When possible, I assessed photographs filed under the subjects Guatemala and Chile, as both countries experienced civil unrest in the latter half of the twentieth century that was widely reported in American newspapers. Other subjects I used included the Kennedy family, particularly John F. Kennedy; the British royal family; and the following popes: Pius XII, John XXIII, Paul VI, John Paul I, John Paul II.
- ³³ I gathered collection data from 55 repositories about 75 individual newspaper photo morgue collections, including data about 6 collections that were not on 2013 LOC list of newspaper photo morgue collections. I was unable to collect any data about photo morgue collections held in 1 public library and 2 historical societies.
- ³⁴ While the bulk of the photo morgue is housed in the San Francisco Public Library, selected images relating to maritime activities are deposited in the San Francisco Maritime National Historical Park, Historic Documents Department, and the negatives from the combined photo morgues are deposited in the Bancroft Library of the University of California Berkeley. "Related Collections," Online Archive of California, San Francisco Public Library (1999), Inventory of *The San Francisco News-Call Bulletin* Newspaper Photograph Archive and Newsclipping Files, ca. 1915–September, 1965, <http://www.oac.cdlib.org/findaid/ark:/13030/tf2r29n63p/>.
- ³⁵ For example, the *Daily Worker* and *Daily World* Photograph Collection and photo morgue for the *Valley Times*, both newspapers with relatively small circulations (but different readerships), contain thousands of news agency prints.
- ³⁶ Samples I examined from the photo morgues of the *Los Angeles Times* and the *Los Angeles Examiner/Herald Examiner* did not include any electrolytic facsimile prints, and only occasional electrolytic prints were found in the samples from the *Washington Star*, the *San Francisco Call-Bulletin*, and the *New York Herald Tribune* despite the fact that these papers handled hundreds of press agency prints from the 1950s to the 1970s. Samples from the *Daily Worker* and *Daily World* Photograph Collection and *Valley Times* photo morgue generated hundreds of electrolytic facsimile prints, some dated within a year of the process's commercial introduction by the news agencies UPI and AP.
- ³⁷ It is possible that geographic proximity and existing relationships between the larger newspapers and the news agency bureaus could have delayed the adoption of the facsimile prints. Christina Rice, senior librarian at the Los Angeles Public Library Photo Collection, noted that in Los Angeles, the larger metropolitan newspapers were located in the same area of downtown Los Angeles as the news agency photo bureaus, and this geographic proximity may have facilitated faster

reception of prints directly from the bureaus by messenger, while the *Valley Times*, located some distance from downtown Los Angeles, greatly benefited from the speed of the new facsimile technology. The relationship between the adoption of early facsimile technology and geographic proximity to news agency bureaus merits further investigation to understand the forces influencing the early adoption of this emerging technology, as does the hypothesis that newspapers' concerns with image quality and permanence were the contributing factors.

- ³⁸ Of the 4 other arrangement methods reported, 3 were complex hybrid systems that used numerical codes as well as subject/date, and 1 is a system developed by the repository based on local geography.
- ³⁹ Society of American Archivists, *Describing Archives: A Content Standard (DACS)*, 2nd ed. (Chicago: Society of American Archivists, 2013), <http://www2.archivists.org/groups/technical-subcommittee-on-describing-archives-a-content-standard-dacs/dacs>.
- ⁴⁰ In 2015, 238 requests were made to use the photo morgue of the *San Francisco News-Call Bulletin* at the San Francisco Public Library, and collections curator Christina Moretta anticipates increasing use due to recently enhanced online description. Mark Greek, collections coordinator, Special Collections, D.C. Public Library reported that the library's *Washington Star* photo morgue is the most heavily used photo collection, with over 100 research appointments each year. Similarly, the photo morgue of the *Brooklyn Eagle* as reported Ivy Marvel, manager of Special Collections, is the most consulted special collection at the Brooklyn Public Library. Marvel reported that the collection, which is partially digitized, is consulted daily either in-house or remotely. Since opening the collection to users, the *Daily Worker* and *Daily World* Photograph Collection has been the most frequently used collection at the Tamiment Library and Robert F. Wagner Labor Archives.
- ⁴¹ Ricardo L. Punzalan in his 2014 article addressed the issues and complexities inherent with split and dispersed photograph collections. Punzalan investigated these collections through the "framework" of diaspora studies. According to Punzalan, "While the scattering of archival records among various repositories' and custodies by no means equates to the experiences of people in diasporic communities, certain commonalities exist." Ricardo L. Punzalan, "Archival Diasporas: A Framework for Understanding the Complexities and Challenges of Dispersed Photographic Collections," *The American Archivist* 77 (Fall/Winter 2014): 326–49.
- ⁴² Punzalan, "Archival Diasporas," 347.
- ⁴³ Bronx Documentary Center, *Altered Images: 150 Years of Posed and Manipulated Photography*, <http://www.alteredimagesbdc.org/#/oj-simpson/>.
- ⁴⁴ Robert Channick, "Johnson Publishing to Sell Historic Photo Archive," *Chicago Tribune*, January 23, 2015.
- ⁴⁵ With the exception of one small collection, none of the collections undergoing item-level processing were fully processed at the time of assessment.
- ⁴⁶ It is basic preservation policy to require the use of gloves while handling photographs. I recommend nitrile gloves for less impact on manual dexterity than cotton gloves.
- ⁴⁷ Alex Dawson, ed., *Benchmarks in Collection Care 2.0* (London: Collections Trust, 2011), <http://collectionstrust.org.uk/resource/benchmarks-in-collections-care-2-0/>.
- ⁴⁸ The "anchor-point" for cold storage (according to the Image Permanence Institute) is 40 degrees Fahrenheit. Peter Z. Adelstein, *IPI Media Storage Quick Reference*, 2nd ed. (Rochester, N.Y.: Image Permanence Institute, 2009), https://www.imagepermanenceinstitute.org/webfm_send/301.
- ⁴⁹ The "anchor-point" for cool storage (according to the Image Permanence Institute) is 45 degrees Fahrenheit. Adelstein, *IPI Media Storage Quick Reference*.
- ⁵⁰ For more information about savenews initiatives, visit <http://savenews.org/>.
- ⁵¹ The American Library Association (ALA) Government Relations, "Appropriations," <http://www.ala.org/advocacy/libfunding/public>.
- ⁵² Disclaimer: This guide is intended to provide basic information on the facsimile processes used by U.S.-based news agencies that I observed during research. It is likely that some collections may include additional facsimile processes.
- ⁵³ Recommendations presented in this appendix are derived from currently available published sources including the following: Batterham, *The Office Copying Revolution*; Adelstein, *IPI Media Storage Quick Reference*, Murphy, "XRF Identification of 20th Century Developer-Incorporated Stabilized Prints," 100–109; Wessling, "Characterizing United Press International's Unifax Facsimile Prints," 179–89.

⁵⁴ RH = Relative Humidity.

⁵⁵ These recommendations use the environmental categorizations defined in the *IPI Media Storage Quick Reference*. The “anchor-point” temperature for ROOM is 68°F (20°C); COOL is 54°F (12°C); COLD is 40°F (4°C). FROZEN is any environment where the average temperature is at or below 32°F (0°C).

⁵⁶ These benchmarks are current recommendations based on published sources, particularly Adelstein, *IPI Media Storage Quick Reference*; Dawson, ed., *Benchmarks in Collection Care 2.0*.

⁵⁷ RH = Relative Humidity

⁵⁸ PAT = Photographic Activity Test, Image Permanence Institute, <https://www.imagepermanenceinstitute.org/testing/pat>.

ABOUT THE AUTHOR



Laura McCann is the conservation librarian in the Barbara Goldsmith Preservation and Conservation Department at New York University (NYU) Libraries, where she is responsible for the treatment and preventive conservation programs. She holds an MS in library and information science from the Palmer School, Long Island University; an MA in paper conservation from Camberwell College of Arts; and a BA in art history from Bates College.