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The photographic negative as a historical object : an analysis of the Henryk Ross Łódź ghetto collection at the Art Gallery of Ontario

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THE PHOTOGRAPHIC NEGATIVE AS A HISTORICAL OBJECT:
AN ANALYSIS OF
THE HENRYK ROSS ŁÓDŹ GHETTO COLLECTION
AT THE ART GALLERY OF ONTARIO

by

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Honours Bachelor of Fine Arts in Photography Studies, Ryerson University, 2005

A Thesis Presented to

Ryerson University
and
Art Gallery of Ontario

in partial fulfillment of the requirements for the degree of

Master of Arts
in the Program of
Photographic Preservation and Collections Management

Toronto, Ontario, Canada, 2010

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ABSTRACT

The Photographic Negative as a Historical Object:
An Analysis of the Henryk Ross Łódź Ghetto Collection at the Art Gallery of Ontario
Master of Arts
2010
Lindsay M. Bolanos
Photographic Preservation and Collections Management
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The Photographic Negative as a Historical Object: An Analysis of the Henryk Ross Łódź Ghetto Collection at the Art Gallery of Ontario examines the photographic negative, with specific attention to the negative as a historical document. Through an analysis of Jewish photographer Henryk Ross' photographic archive, this discussion considers the negative as a historical object by addressing the production, use, dissemination and preservation of the negative using select samples from the 3,000 35mm gelatin silver negatives in the collection, along with Ross' 1960s publication *Darkam ha-a, Æaronah shel Yehude Lodz'* (*The Last Journey of the Jews of Łódź*), and Martin Parr and Timothy Prus' 2004 *Łódź Ghetto Album*. By acknowledging the use value of the negative, this thesis focuses on the unique qualities of the photographic negative as a research tool, bringing forth new components to the history of this rare collection.

ACKNOWLEDGEMENTS

I would like to take this opportunity to thank the many people who have offered guidance and support throughout the course of this thesis endeavour. I began this venture with the Henryk Ross Łódź Ghetto Collection with dedication and determination to somehow understand and learn from this remarkable photographer and his body of work. I hope that through this thesis, I will shed new light on this rare compilation of photographic documents that represent a dark period in the history of humanity, and that I might add another piece to the ‘history’ of this collection.

To my thesis advisor, Thierry Gervais, who has helped me to understand what it means to research, the importance of continuing to move further and delve deeper into my research, as well as to take a step back and look at the bigger picture. From learning to observe, question and reassess, you have encouraged me through each step of this process, and for that I am thankful. To the faculty members at Ryerson University, including David Harris, Dr. Chris Evans, Marta Braun, Robert Burley, and Sophie Hackett, you have all been a part of this process, and I thank each of you for your assistance. Also, to Maia-Mari Sutnik, my second reader, and the reason the Henryk Ross materials reside at the Art Gallery of Ontario, I thank you for the chance to study this collection.

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INTRODUCTION

The Henryk Ross Łódź Ghetto Collection is a unique compilation of mementos and tokens amassed by Jewish photographer Henryk Ross (1910-1991), between 1940 and 1944.¹ Within Ross' archive, collected administration documents, personal notes, posters and souvenirs intermingle among the photographic evidence documented by Ross during the time in which he was sequestered within the confines of the Jewish ghetto at Łódź, Poland. As a photographer commissioned by the Jewish Administration, the governing body within the ghetto walls, Ross had the opportunity to photograph required subject matter – documentation of administrators, workers, and buildings of the ghetto – but at the time also captured moments of everyday life as experienced by the ghetto inhabitants.

Upon notice of the ghetto's liquidation, Ross buried his collection within the boundaries of the ghetto in 1944, in hopes of preserving “a historical record of ... martyrdom” for the Jewish people.² These documents were unearthed by Ross when he returned to Łódź in March 1945. With over 3,000 surviving 35mm negatives in this collection documenting everyday life within the ghetto, these negatives represent historical documents that survived the Holocaust. The collection of Ross' materials was first acquired in 1997 by the Archive of Modern Conflict in London, England, and in 2007 became a part of the photographic holdings at the Art Gallery of Ontario.

¹ Martin Parr and Timothy Prus, eds., *Łódź Ghetto Album* (London: Boot, 2004), cover.

² *Ibid.*, 27.

The information presented to the public regarding the events of the Holocaust can be found in history books, with photographs of concentration camps and the written accounts of survivors, and viewers have become accustomed to these forms of information depicting violence and devastation. While images such as these do exist within the Ross collection, photographic representations of daily life and routine existence also provide another element, bringing a more complete representation of ghetto life, realized through both the public and private photographic records created by Ross.

Negatives from the Łódź Ghetto collection were chosen for study in this thesis due to their untapped capacity as a historical object. While other materials within the collection have been researched, the negatives are the primary documents, the source of all print reproductions, which underwent the act of survival to convey Ross' photographic narrative. As such, they have been selected to analyze the difference between the information presented on a negative, versus its print counterpart, as well as explore the past, present and future of such original documents within a photographic collection.

The negative component from Ross' collection was produced on 11 different brands or types of film. The subject matter captured on the negatives reveal aspects of everyday life within the ghetto including official photographs as requested by the administration, juxtaposed with Ross' personal photographic documentation of occupations, living conditions, items, documents, destruction, aerial views, transportation, group images, weddings, celebrations and children. Through an examination of the negatives, representations of devastation and destruction can be found alongside images of beauty, love and intimate peaceful moments. Henryk Ross'

photographs reveal another side of ghetto life, and as such, are important representations of this period in history.

The dissemination of photographs from the Ross collection have been published in the form of positive images produced from the original negatives. From the first distribution of images in his 1960s book titled *Darkam ha-a,Æaronah shel Yehude Lodz'* (*The Last Journey of the Jews of Łódź*), Ross published his images forming a narrative of death and destruction. The 2004 publication *Łódź Ghetto Album* by Martin Parr, Timothy Weber, and Timothy Prus, presents a more encompassing depiction of the collection's photographic material. While these publications present Ross' imagery, they reveal a partial narrative of the photographer's work methodology and the narratives he generated through the act of photographing.

Although issues associated with understanding the negative arise, such as its inverted tonal values and small size, fundamental information can be obtained from the negative as a historical object. Ross' work methodology and the sequence in which he captured images tell a story of moments witnessed and the impact they made on this photographer. The negative can also impart information regarding materials available, deterioration issues faced during their survival, and concern for future preservation and conservation of a unique body of work. To examine these issues, negative samples from the Ross collection will be selected to demonstrate the ability to use a negative as a research tool to understand the photographic process from the moment the image is captured, its capacity to be shaped into narratives, as well as its future as a historical object.

In order to comprehend the scope of the negative component, the body of work was assessed to determine materials present, recorded information found on the negatives, and areas of study for the thesis that would analyze the negatives to recognize the complexities of this collection. Since this collection is too large to study in full for the time frame of this endeavor, individual negative frames, negative strips of two to six frames, and full negative sheets were chosen after an examination of the collection had been completed. Each sample was specifically selected to appropriately illustrate the issues that will be addressed in the analysis as a direct example to represent the entire collection.

To specifically determine what can be learned from these documents, the following analysis sections will be explored: the production elements of Ross' negatives, discussing the negatives as objects through an assessment of the materials and deterioration issues; and the post-production use of the source negatives, analyzing negative strips and the images recorded within individual frames, as well as an examination of Ross' cataloguing methods. Following the study of the object component of the negative collection, the thesis will explore the dissemination of images through an analysis of Ross' 1960s publication, *Darkam ha-a, Aeronah shel Yehude Lodz'* (*The Last Journey of the Jews of Łódź*), and the later presentation of images in *Łódź Ghetto Album* created by editors Martin Parr and Timothy Prus in 2004. Through a comparison of the negatives and the book publications, this section will focus on the layers of shaped narratives based upon original documents, citing how the reading and understanding of the source materials can be interpreted through post-production efforts. The final area of discussion will address the future of the negative collection, observing the current storage

conditions as well as recommendations for the conservation and preservation of this rare collection.

As a historical document, the negative can be recognized as a primary source for researchers, scholars and collecting institutions. The ability to understand and use a negative as a historical object in which information can be gathered is an area of research which has been underdeveloped. This thesis intends to acknowledge the use value of the negative to complement previous research regarding Ross and his use of photography to document ghetto life, bringing forth new components to the history of this unique photographic collection.

LITERATURE SURVEY

Research for this literature survey has been conducted, with specific attention to the question of what information can be learned from the negative as a historical document. Past research analyzing Ross' print collection has been conducted; however, the negative collection has not independently been researched or studied. The discussion of previous research will be presented in three distinct topics – first, sources that have examined Henryk Ross and the Łódź Ghetto; second, literature pertaining to the use of photographs as historical sources; and third, sources that discuss the negative as a physical object. While theoretical analyses regarding the use of Holocaust imagery to understand memory, feeling and trauma were researched, this literature survey will focus on material relevant to a historical analysis of the Ross negative collection.³

Henryk Ross and the Łódź Ghetto

To gain historical insight and establish context regarding Henryk Ross and the creation of his photographic collection, sources outlining the characteristics and circumstances faced in Łódź Ghetto provided background information. Lucjan Dobroszycki's 1984 book titled *The Chronicle of the Łódź Ghetto, 1941-1944*, set the standard for producing a historical survey of the ghetto during its existence, using records and archives to piece together a chronologically-

³ Ulrich Baer, *Spectral Evidence: The Photography of Trauma* (Cambridge, Mass.: MIT Press, 2002); Roland Barthes, *Camera Lucida: Reflections on Photography*, trans. Richard Howard (New York: Hill and Wang, 1980); Michael Bernard-Donals, *Forgetful Memory: Representation and Remembrance in the Wake of the Holocaust* (Albany, NY: State University of New York Press, 2009); Lawrence L. Langer, *Holocaust Testimonies: The Ruins of Memory* (New Haven: Yale University Press, 1991); Andrea Liss, *Trespassing Through Shadows: Memory, Photography, and the Holocaust* (Minneapolis: University of Minnesota Press, 1998); Susan Sontag, *On Photography* (New York: Farrar, Straus and Giroux, 1978); Susan Sontag, *Regarding the Pain of Others* (New York: Farrar, Straus and Giroux, 2003).

based analysis. This led to subsequent book publications including *Łódź Ghetto: Inside a Community Under Siege* by Alan Adelson, Robert Lapides, and Marek Web in 1989, Isaiah Trunk's *Łódź Ghetto: A History* in 2006 and most recently *Ghettostadt: Łódź and the Making of a Nazi City* by Gordon J. Horowitz in 2008. Each of these publications present the detailed evolution of ghetto life based upon salvaged government documents from the ghetto and personal accounts, describing the creation of the confined quarters, the ruling hierarchy of the Jewish Administration, the hardships faced by the inhabitants of this labour facility, and the final deportation of its community.

Extending from this overall depiction of the ghetto, further literature provided Ross' biographical information as well as the context in which Ross photographed his images. In Janina Struk's *Photographing the Holocaust: Interpretations of the Evidence* (2004), the author recounts essential biographical information to understand Ross as a photographer and an inhabitant of the ghetto. Struk explains that Ross had been a photojournalist before the war and upon entering the ghetto was selected by the Jewish Administration's Statistics Department to photograph every inhabitant in the ghetto for their identity cards, as well as portraits of officials, documents of buildings, neighbourhoods and workers, and images of the deceased.⁴ Additional details surrounding the secret documentation carried out by Ross, is found in Anna Eilenberg-Eibeshitz's *Preserved Evidence, Ghetto Łódź* (1998), a collection of testimonies from those who endured the struggles firsthand within Łódź Ghetto. In one account, artist Sarah Fajtlowicz-Gliksman describes the formation of a resistance group of photographers in the Statistics

⁴ Janina Struk, *Photographing the Holocaust: Interpretations of the Evidence* (New York: I.B. Tauris, 2004), 86–87.

Department to document all aspects of the ghetto.⁵ Those authorized to carry a camera, such as Ross, could freely roam the ghetto without question. Alan Adelson, in his essay titled “The Photographs and Photographers” from *Diary of D. Sierakowiak: Five Notebooks From the Łódź Ghetto* (1996), states that Ross was provided with film, chemicals and paper to document ghetto industry, but also independently recorded the lives within the community.⁶

Sources which present Ross’ photographic work included *Darkam ha-a,Æaronah shel Yehude Lodz' (The Last Journey of the Jews of Łódź)* (196?) and *Łódź Ghetto Album* (2004) by Martin Parr, Timothy Weber, and Timothy Prus. Ross recovered his negatives upon returning to Łódź in 1945, and in the 1960s, created a book of photographs with typed captions presenting life in Łódź Ghetto through images of starvation, death and destruction. It was in 1997 when Ross’ son made the collection available to the Archive of Modern Conflict in London, England, that the negatives and prints became part of another private collection. As the first publication to completely address this photographer’s entire body of work, authors Timothy Prus, curator at the Archive of Modern Conflict, and photographer/collector/curator Martin Parr created a publication that provides a fresh, independent look at Ross’ ghetto photographs. Here, not only images of devastation were included, which had been shown in previous publications, but also photographs documenting happier moments, revealing the many aspects of life in the ghetto. Particular examples from Ross’ several thousand negatives were reproduced in this book; however, Timothy Weber, historian and author of the book’s textual component, states, “most of

⁵ Anna Eilenberg-Eibeshitz, *Preserved Evidence, Ghetto Lodz* (Haifa: H. Eibeshitz Institute for Holocaust Studies, 1998), 341–342.

⁶ Alan Adelson, “The Photographs and Photographers”, in *Diary of D. Sierakowiak: Five Notebooks From the Łódź Ghetto* (New York: Oxford University Press, 1996), 269.

the negatives are yet to be printed as individual photographs, and there is still much to learn from them”.⁷

With each publication examined in this section of research, life within Łódź Ghetto and the driving force behind the photographic documentation of Henryk Ross was revealed. Although photographic prints produced from Ross’ negatives have been made available through print and exhibition,⁸ the images were published independently as positives, neglecting the negatives themselves as significant historical objects.

The Photographic Print

In general, the use of photographic prints as research tools has remained a rare occurrence in the field of historical research. In *History and Its Images: Art and the Interpretation of the Past*, Francis Haskell addresses the use of imagery to understand history, further commenting on the introduction of photography and its role as a historical tool. Haskell states, “Photographs are the popular historicism of our era; they confer nothing less than our reality”⁹ but also notes that over time, “serious historians showed themselves to be increasingly

⁷ Martin Parr and Timothy Prus, eds., *Łódź Ghetto Album* (London: Boot, 2004), 9.

⁸ Photographic prints from the Henryk Ross Łódź Ghetto Collection were presented to the public in an exhibition at Les Rencontres d’Arles photography festival in 2004, and were on display during the course of the festival from July 8 until September 19, 2004. This was the first opportunity for public viewing of the private imagery contained within the collection, and the first exhibition of images displayed as large, framed print reproductions. Images from the negative collection were selected by Martin Parr and Timothy Prus, editors for the 2004 publication, *Łódź Ghetto Album*.

⁹ Francis Haskell, *History and Its Images: Art and the Interpretation of the Past* (New Haven: Yale University Press, 1993), 4.

reluctant to use the evidence offered by art or artefacts when trying to interpret the past.”¹⁰ Barbie Zelizer, in *Holocaust Photography, Then and Now* (1999) and *Remembering to Forget: Holocaust Memory through the Camera's Eye* (1998), further discusses this notion that photography is a “powerful interpretive tool”¹¹ with an “aura of realism that could convey the ‘appropriate truth about atrocity.’”¹² Holocaust imagery, like that produced by Ross, was displayed in the 2001 exhibition by Clément Chéroux titled *Mémoire des camps: Photographies des camps de concentration et d'extermination nazis, 1933-1999*. This photographic exhibition presented Holocaust images for the first time as historical documents. Through the presentation of such images and written text in the exhibition catalogue, Chéroux addresses the significant loss of historical value associated with such prints.¹³ He cites examples that reveal the inaccurate use of photographic imagery as documentation, through misleading or incorrect captions. By restoring use value and legitimacy to these photographic documents, respect and accuracy is restored to photographs as historical research documents.

While Chéroux discusses the use of photographic prints as historical resources, the connection to photographic negatives as historical objects has not been addressed. Negatives are complicated objects to interpret and display, due to their inverted values and small size, and as such they have not extensively been researched as a medium for documentation. What

¹⁰ Francis Haskell, *History and Its Images: Art and the Interpretation of the Past* (New Haven: Yale University Press, 1993), 2, 3.

¹¹ Barbie Zelizer, *Remembering to Forget: Holocaust Memory through the Camera's Eye* (Chicago: University of Chicago Press, 1998), 6.

¹² Barbie Zelizer. “Holocaust Photography, Then and Now”, in *Picturing the Past: Media, History, and Photography*, ed. Bonnie Brennen and Hanno Hardt (Urbana and Chicago: University of Illinois Press, 1999).

¹³ Clément Chéroux. *Mémoire des camps: Photographies des camps de concentration et d'extermination nazis, 1933-1999* (Paris: Marval, 2001).

knowledge can be gained from the negative as an original source for historians and researchers has not thoroughly been examined, and as such, photographic negatives have only been appreciated as a technical process resulting in the photographic print.

The Photographic Negative

The third avenue of research addressed literature pertaining to the negative as a historical object. Often viewed as technical explanations of an invented process, major photography history texts, such as Michel Frizot's *A New History of Photography* (1998), recount the evolution of the photographic negative through Talbot's invention of the paper negative, Frederick Scott Archer's collodion advancements, the rise of gelatin silver and roll film, and finally the success of the 35mm camera.¹⁴ Each of these accounts provide historical context for the photographic materials that comprise the negative component of the Ross collection.

In addition to this larger historical perspective, Maria Fernanda Valverde's *Photographic Negatives: Nature and Evolution of Processes* (2005) explains the technical progression of the gelatin silver negative and various substrate compositions. By examining Ross' negative strips, particular image frames reveal signs of deterioration and image degradation including emulsion damage and staining, most likely due to the environmental factors they faced while residing underground in wooden barrels. To understand such deterioration issues that provide information about the life of the negative, several additional references discussing preservation issues of the gelatin silver negative were examined. These included Bertrand Lavédrine's *A Guide to the Preventive Conservation of Photograph Collections* (2003) and *Photographs of the Past:*

¹⁴ Michel Frizot, ed., *A New History of Photography* (Köln: Könemann, 1998). 91, 233, 238.

Process and Preservation (2009), as well as Mary Lynn Ritzenthaler's *Photographs: Archival Care and Management* (2006).

In the 11th issue of *Études Photographiques*, published in 2002, François Cheval's essay "L'épreuve du musée" addresses photography's place within an art institution, noting a print has a use value within an institution as an object which can be exhibited and showcased, whereas the negative falls into the darkness of a undecided status.¹⁵ As the negative is much smaller in size, has inversed tonal ranges and must be lit from behind in order to view the image, the logistics of a negative's use value for exhibition purposes is much more complex, and therefore is not given high importance among a collection of photographic prints.

Using the negative as an object from which information can be acquired is a form of research that has long been neglected.¹⁶ Ilse About and Clément Chéroux address the failure by historians to use photographic objects when conducting research, in their article, "L'histoire par la photographie" in the 10th issue of *Études Photographiques* (2002). The authors state that the negative is the primary source, representing a raw image not cropped, untouched and therefore much closer to what might have been observed by the photographer.¹⁷ In analyzing the photographic process, one can define the negative as a matrix, a term defined by Merriam-Webster Dictionary as "something within or from which something else originates, develops, or

¹⁵ François Cheval, "L'épreuve du musée," *Études Photographiques* 11 (May 2002): 4–43.

¹⁶ According to Janet Lehr, a New York photography dealer, "the field is under-researched". John Loengard, *Celebrating the Negative* (New York: Arcade Publishing, 1994), 6.

¹⁷ Ilse About and Clément Chéroux, "L'histoire par la photographie," *Études Photographiques*, 10 (November 2001), <http://etudesphotographiques.revues.org/index261.html> (accessed November 8, 2009).

takes form.”¹⁸ Subsequent prints produced from a negative that might undergo such alterations could change the original reading captured on the negative. Through this understanding, the negative is the initial object created, and as such is a relevant document that through study can bring further comprehension to a particular history, in this case, the history of Ross’ Łódź Ghetto collection.

Conclusion

In general, photography is regarded as a means of documentation, and that photographic prints represent historical documents, but it appears as though the negative has been relegated to the status of only an important step in the photography process. There are viewing issues that render the photographic negative more difficult to interpret, where it is much easier to view and analyze a print made from such negatives. As previously mentioned, printed negatives can undergo cropping, retouching, or alterations which would obscure the original raw information recorded on the negative. With that said, the negative is a specific document representing a moment in time as it occurred, free of any later alterations in the printing process.

The negative as a historical document reveals a history in which one can piece together a photographer’s view based on his work methodology and the subject matter represented on a negative strip. Loengard describes negatives as just tools with no value,¹⁹ but it is apparent that they retain historical information, and are just as much a historical document as a print made

¹⁸ Merriam-Webster Dictionary Online, s.v. “Matrix,” <http://www.merriam-webster.com/dictionary/matrix> (accessed February 11, 2010).

¹⁹ John Leongard, *Celebrating the Negative* (New York: Arcade Publishing, 1994), 5.

from them, perhaps a more accurate representation of the moment they record. This thesis analysis will focus on the ability of this collection of negatives to bring new elements to the history of Henryk Ross.

THE PHOTOGRAPHIC NEGATIVE AS A SOURCE OF INFORMATION

Cellulose Nitrate Issues

After creating an inventory of the negative component of the collection, it was determined that the photographic negatives were produced on 11 different brands or types of film: Agfa Isopan F, Agfa Isopan ISS, Agfa Isopan Ultra, Agfa Isochrom F, Alfa, Hauff, Kodak AG Plus X Panchro, Mimosa, Opta, Perutz, and Voigtländer. When the collection was acquired by the Art Gallery of Ontario, the institution had been notified by the Archive of Modern Conflict that the film materials were cellulose acetate based, however, the time period in which these negatives were produced coincides with the final years in which cellulose nitrate film was produced, and gradually replaced by the more stable cellulose acetate film.

Cellulose nitrate, a flexible film base, was introduced in 1889 as a lightweight and resilient substitute for glass plates.²⁰ This plastic alternative had one major drawback, as it was highly flammable, and was the cause of many disastrous fires.²¹ Nitrate based films were banned in the 1950s, and replaced with a more stable, fire-retardant cellulose acetate option.²² Over time, it became apparent within film collections that cellulose nitrate had a tendency to decompose and

²⁰ Bertrand Lavédrine, *A Guide to the Preventive Conservation of Photograph Collections*, ed. Jean-Paul Gandolfo, Sibylle Monod, and Getty Conservation Institute, trans. Sharon Grevet (Los Angeles: Getty Conservation Institute, 2003), 17.

²¹ Based upon the foundation of cellulose plastics composed of carbon, oxygen and hydrogen, the nitro group (ONO₂) when attached to the cellulose molecule produces flexible cellulose nitrate. The “flammability of cellulose nitrate film is a consequence of the fact that oxygen from the nitro side group (ONO₂) is readily available to sustain combustion.” James M. Reilly, Peter Z. Adelstein, and Douglas W. Nishimura, *Preservation of Safety Film: Final Report to The Office of Preservation, National Endowment for The Humanities* (Rochester, NY: Image Permanence Institute, Rochester Institute of Technology, 1991), 5–6.

²² In acetate film bases, the acetate group, CH₃COO-, or related structure is bonded to the D-glucose rings of the cellulose polymer. Francis A. Carey, *Organic Chemistry, 7th Edition* (Toronto: McGraw-Hill, 2008).

release nitric acid, creating an autocatalytic chemical reaction which accelerated the deterioration of the materials until the negative was completely destroyed.²³

To determine the type and stability of the materials which comprise the Ross negative collection, burn tests were conducted on January 20, 2010, with Katharine Whitman, Conservator of Photographs at the Art Gallery of Ontario. Samples of film, approximately 1.0 x 5.0 mm, were cut from the edges of the chosen film strips representing the 11 different film types. Within a ventilated environment, the specimens were placed in contact with a direct flame, and the rate of combustion was observed. Indication of film type can be identified due to the rate in which the specimen burns – rapid burning is identified as cellulose nitrate, where cellulose acetate fragments “stop burning when the flame goes out.”²⁴ Ten out of eleven samples burned rapidly when in contact with the flame, and as a result were deemed to be composed of cellulose nitrate.²⁵ When in contact with the flame source, the Alfa sample stopped burning when the flame went out, approximately half way down the length of the sample, and as a result was identified as a cellulose acetate film base. The conclusions derived from the flame test impact the stability and longevity of the negative collection, and initiatives to preserve and conserve these historical documents will further be addressed later in this analysis.

²³ Maria Fernanda Valverde, *Photographic Negatives: Nature and Evolution of Processes* (Rochester, N.Y.: Advanced Residency Program in Photograph Conservation, 2005), 21.

²⁴ Bertrand Lavédrine, *A Guide to the Preventive Conservation of Photograph Collections*, ed. Jean-Paul Gandolfo, Sibylle Monod, and Getty Conservation Institute, trans. Sharon Grevet (Los Angeles: Getty Conservation Institute, 2003), 18.

²⁵ As per the results of the burn test conducted January 20, 2010, the following film samples were identified as cellulose nitrate: Agfa Isopan F, Agfa Isopan ISS, Agfa Isopan Ultra, Agfa Isochrom F, Hauff, Kodak AG Plus X Panchro, Mimosa, Opta, Perutz, and Voigtländer.

Based upon the findings from the burn test analysis, the time frame in which this collection of negatives can be researched is extremely sensitive. As explained, cellulose nitrate can easily and quickly deteriorate until the film base is completely destroyed, and with it the subject matter documented within the emulsion. As a result, it is important to analyze the recorded materials before the collection's components sustain further degradation. This thesis analysis is a window of opportunity to study not only the materials within the collection, but the subject matter recorded on them, before this collection disappears.

Cellulose nitrate negatives are subject to particular forms of degradation based upon the chemical components of the film's substrate.²⁶ Due to its chemical instability, nitrate negatives can undergo various stages of degradation based upon variances in temperature and relative humidity within the storage environment. Silver image and nitrate decay, binder degradation and mould are all deterioration issues faced by nitrate negatives.²⁷ The progressive stages of deterioration are irreversible, and can be categorized into six phases:

²⁶ Chemical instability in cellulose nitrate film is impacted by the nitro side groups attached to the cellulose molecule. Hydrolysis, "separation by water" where "nitro groups ...becom[e] detached" from the cellulose molecule releases NO₂ into "the body of the film base" and occurs as a result of increased moisture content within the storage environment, dependent upon temperature and humidity. James M. Reilly, Peter Z. Adelstein, and Douglas W. Nishimura, *Preservation of Safety Film: Final Report to The Office of Preservation, National Endowment for The Humanities* (Rochester, NY: Image Permanence Institute, Rochester Institute of Technology, 1991), 13.

²⁷ Peter Z Adelstein, *IPI Media Storage Quick Reference, 2nd Edition* (Rochester, N.Y.: Image Permanence Institute, 2009), 3.

Table 1: Deterioration Stages of Nitrate Film Negatives

Stage 1	No deterioration
Stage 2	Film support turns yellow and the image shows signs of silver mirroring
Stage 3	Film becomes sticky and gives off a strong odor of nitric acid
Stage 4	Film becomes amber in color and the image begins to fade
Stage 5	Film is soft and can adhere to adjacent negatives or enclosures
Stage 6	Film turns into a brown acid powder

Source: Maria Fernanda Valverde, *Photographic Negatives: Nature and Evolution of Processes* (Rochester, N.Y.: Advanced Residency Program in Photograph Conservation, 2005), 21.

Although the negatives within the Ross collection remain within the Stage 1 and 2 categories, the instability and time sensitive nature of cellulose nitrate negatives require close observation and maintenance to ensure their longevity. The negatives within the collection reveal other signs of deterioration faced by the materials during their lifespan. By examining a particular sample from the Ross collection, the deterioration issues present in the sample negatives can assist in comprehending deterioration factors faced by the entire negative collection, as well as understand the storage conditions, providing background context into the survival and existence of these rare objects.

Negative Sheet 17 from the collection displays a variety of negative frames on three different types of cellulose nitrate film: Agfa Isopan F, Agfa Isopan Ultra and Perutz (Figure 1). The ten individual negative strips display varying signs of deterioration. The first strip reveals evidence of exposure to heat, as shown by the brown staining along the top edge in three different areas (Figure 2). These burn marks are consistent with roll storage, where the negatives were wound and stored in roll form. The brown markings appear exactly the same in the three areas, where a particular area of the roll was exposed to a heat source. Vertical areas of missing photographic information are also present within the first four frames of this strip. This lack of



Figure 1. Henryk Ross, "Negative Sheet Number 17", Henryk Ross Łódź Ghetto Collection, Art Gallery of Ontario.



Figure 2. Henryk Ross, “Negative Sheet Number 17, Frame 489”, detail of burn marks and improper processing, Henryk Ross Łódź Ghetto Collection, Art Gallery of Ontario.

image detail can also be attributed to the existence of the negatives in roll form, but during development instead of storage. The absence of developed detail is usually explained by uneven development during processing, where the film did not come in complete contact with the chemical developer.

The second negative strip within this sheet is a prime example of deterioration caused by water damage (Figure 3). This type of damage results in missing photographic emulsion, as the water has dissolved the gelatin in this localized degradation. Water also causes gelatin to swell, where it can become attached to other negative strips, and the emulsion can tear away.²⁸ The removal of emulsion results in concentrated areas which do not contain photographic information, as seen at the end of negative frame 495. The fourth strip, which is only one negative frame labelled 498, reveals signs of improper processing. In this instance, the film was wound too tightly during processing, and the chemicals did not come in contact with the entire film surface. As a result the center of the exposed image is processed, while the outer areas remain undeveloped.



Figure 3. Henryk Ross, “Negative Sheet Number 17, Frame 495”, detail of water damage, Henryk Ross Łódź Ghetto Collection, Art Gallery of Ontario.

²⁸ Southeast Asia-Pacific Audio Visual Archive Association, *Film Preservation Handbook*, <http://www.pia.gov.ph/seapavaa/FilmPreservationHandbook/Home.htm> (accessed May 23, 2010).



Figure 4. Henryk Ross, “Negative Sheet Number 17, Frame 500”, detail of sprocket hole tearing, Henryk Ross Łódź Ghetto Collection, Art Gallery of Ontario.

The sixth and eighth negative strips reveal signs of brittleness and tearing along the outer edges (Figure 4). Here, sprocket holes and edges have been tattered due to a lack of moisture content in the film base, resulting in a brittle sample subjected to breakage.²⁹ Brittleness is a noted sign of deterioration in cellulose nitrate films when stored in a dry environment.³⁰ The absence of moisture content within the film base structure results in an increase in flammability, and

the instability of the samples become a danger to the surrounding materials.

The deterioration samples selected for this section of the analysis display various signs of degradation prevalent on several different brands of cellulose nitrate film, which are indicative of the deterioration issues present in the entire negative collection. As previously mentioned, the negative collection was buried underground upon notice of the ghetto’s liquidation in 1944. Some of these signs of deterioration can most likely be linked to the period in which the images were buried in wooden barrels from 1944 until 1945, where the conditions in which they resided would have contributed to the degradation noted. When the contents were retrieved in 1945, they had spent a period of one year in conditions which produced variances in temperature, moisture and pollutants, contributing to chemical, mechanical and biological decay.

²⁹ Southeast Asia-Pacific Audio Visual Archive Association, *Film Preservation Handbook*, <http://www.pia.gov.ph/seapavaa/FilmPreservationHandbook/Home.htm> (accessed May 23, 2010).

³⁰ Bertrand Lavédrine, *A Guide to the Preventive Conservation of Photograph Collections*, ed. Jean-Paul Gandolfo, Sibylle Monod, and Getty Conservation Institute, trans. Sharon Grevet (Los Angeles: Getty Conservation Institute, 2003), 17.

The analysis of production materials and deterioration issues identified within the Ross negative collection present the importance of time and the degradation limits associated with this body of work. The significance of this collection is directly proportionate to the lack of time remaining to study these original objects before they become indistinguishable.

The Work Process through the Photographic Negative

In addition to an analysis of the materials used to produce the negatives, individual negative strips were examined to identify visible technical indicators that would assist in explaining Ross' artifacts through exposure and processing. Samples were chosen to best illustrate the production, use, dissemination and preservation issues associated with the negative collection. A strip of negatives assists in the explanation of these themes by illustrating the topic discussed through a small series of images, instead of one single frame. Negative Sheet 3 from the Ross collection has been selected, and presents an assortment of negative strips displaying the materials available to Ross during the time in which he recorded the Łódź Ghetto images (Figure 5). In this sample, there are four different cellulose nitrate film brands housed within the one sleeve: Agfa Isopan F, Agfa Isopan ISS, Kodak AG Plus X Panchro, and Perutz.

The first strip of negatives, recorded on Isopan F film, reveals a set of three frames that are overexposed, and underdeveloped. As a result, the recorded information is difficult to distinguish. The second strip, containing two image frames on Kodak AG Plus X Panchro, are also overexposed, and display uneven development by a dark, vertical area through the left frame. The next two negative strips, also documented on Kodak AG Plus X Panchro, are more properly exposed, and the information recorded can easily be distinguished. Signs of uneven development can be identified on the last frame of the third strip, as evidenced by a dark vertical region through the image. Overdeveloped areas around the sprocket holes can be seen on the second, third and fourth frames of the fourth negative strip. The fifth and sixth strips are recorded on Agfa Isopan F film, and reveal variances in exposure and development. The fifth strip



Figure 5. Henryk Ross, "Negative Sheet Number 3", Henryk Ross Łódź Ghetto Collection, Art Gallery of Ontario.

maintains even exposure and development, while the first two frames of the sixth strip are overexposed, and the remaining three frames are underexposed. Variances in the width between exposures can also be observed, particularly on the fifth strip, revealing a deficiency in the winding mechanism of the camera used to record these images, as a complete advancement of the winding mechanism would present a larger space between frames, while a smaller space would be the result of an incomplete winding motion. The final negative strip is recorded on Perutz film, and is overexposed and underdeveloped, resulting in very dense negative information.

Overall, this negative sheet presents a variety of film brands and types used, as well as variances in exposure and developing results. The changes in film brands can be considered irregular among practicing photographers. Most photographers determine a brand of film that is technically best suited to their form of photographing; however, Ross documented his images on 11 different types of film. All of the brands noted are German manufactured except American-made Kodak, an unexpected brand of film to be found within a German occupied territory, but the photographers within the ghetto were only been able to use the supplies that became available at the time. According to Ross, “photographic materials were smuggled to me in exchange for bread,” revealing why a photographer within the ghetto would have access to black market materials, in order to have enough supplies to create his own private documents.³¹

As a practicing news photographer before the formation of the Łódź Ghetto, Ross would have been knowledgeable in basic photographic techniques. As noted on one of Ross’

³¹ Martin Parr and Timothy Prus, eds., *Łódź Ghetto Album* (London: Boot, 2004), 27.

identification cards, found within his archive of photographs and documents, his profession is listed as “foto-reporterem.”³² Ross’ established career as a photographic reporter or photojournalist provided the opportunity to learn the trade through practical experience, supporting his technical abilities as a photographer; therefore the varied quality of the exposed negatives can be linked to the haste associated with his covert photographic methods.

The images documented within Negative Sheet 3 reveal exposure differences resulting from the inability to adapt to various lighting conditions and film speeds. This conclusion is illustrated in the fifth strip of negatives. The first frames are images that would be considered private images, those not requested by the Jewish Administration, but documented by Ross as a record of life in the ghetto. In these instances, he may not have been able to quickly change camera settings to compensate for the lighting conditions present. The final three frames of the strip, images that portray hospital staff, represent requested images by the Administration, and as a result, Ross would have had sufficient time to ensure he documented the image with a properly exposed negative. As a news photographer, Ross was “comfortable with organizing and photographing groups of people.”³³ His technical knowledge of photography supports his ability to capture a properly exposed negative with good composition based upon his previous experiences as a professional photographer, as evidenced through the hospital staff portraits.

The issues with developing result from improper development times or insufficient chemicals that were available to the photographer. The photographers within the Statistics

³² This identification card, stating Ross’ occupation, can be found within the Ross collection at the Art Gallery of Ontario.

³³ Janina Struk, *Photographing the Holocaust: Interpretations of the Evidence* (New York: I.B. Tauris, 2004), 86.

Department had use of darkroom facilities to develop and print requested images.³⁴ The inconsistency in development and processing of the negatives can be attributed to oversaturated or diluted chemicals, irregularity in processing procedures (loading of the film base onto developing equipment) or processing times.³⁵ Although Ross was a practicing photojournalist before his time in the ghetto,³⁶ the secretive manner in which he worked resulted in the need to rush his process, in order to keep his own images from public knowledge.

The examination of individual negative strip samples assists in comprehending the production of these historical objects on a much greater scale. An assessment of the materials, exposure and processing elements describe the manner in which the images were recorded, the work methodology adopted by the photographer, and the subversive practices implemented to ensure such rare documents survived. Due to the circumstances in which the images were created, Ross' methodology may have impacted the quality of the image recorded, but these photographically documented details provide insight into the creation of this distinctive body of work.

³⁴ Alan Adelson, "The Photographs and Photographers", in *Diary of D. Sierakowiak: Five Notebooks From the Łódź Ghetto* (New York: Oxford University Press, 1996), 269.

³⁵ Michael W. Davidson and The Florida State University. *Molecular Expressions: Black and White Film Processing Errors* (Florida: The Florida State University, 2004)
<http://micro.magnet.fsu.edu/primer/photomicrography/bwprocessingerrors.html> (accessed May 23, 2010).

³⁶ Ross was a sports photographer for a Warsaw newspaper before the onset of the Second World War. Martin Parr and Timothy Prus, eds., *Łódź Ghetto Album* (London: Boot, 2004), 11; Janina Struk, *Photographing the Holocaust: Interpretations of the Evidence* (New York: I.B. Tauris, 2004), 86.

INSIDE THE IMAGE

The Negative Strip

An analysis of the production elements documented in Ross' negative collection reveals not only the photographer's work methodology in creating photographic records through the act of photographing, but also provides insight into the editing, sequencing and cataloguing of this photographer's collection. To first examine Ross' photographing techniques, the images recorded within a single strip of negatives can assist in the identification of the photographer's methods of documenting. It has been noted in previous publications regarding the photographic work of Ross that while performing his required acts as a photographer within the Statistics Department for the Jewish Administration, the photographer secretly documented daily life within the ghetto for his own records.³⁷ These private images, more personal in nature, contrast with the requested images from the Jewish Administration, and by closely analyzing each frame within a sequential strip of negatives, it can be determined how Ross captured these distinct images.

The selected sample strip from Negative Sheet 3, contains five frames labelled 80-84, captured on Agfa Isopan F cellulose nitrate film (Figures 6 and 7). This strip reveals five images which document daily life at the Łódź ghetto hospital, located at 36 Lagiewnick Street.

³⁷ Alan Adelson, "The Photographs and Photographers", in *Diary of D. Sierakowiak: Five Notebooks From the Łódź Ghetto* (New York: Oxford University Press, 1996); Anna Eilenberg-Eibeshitz, *Preserved Evidence, Ghetto Lodz* (Haifa: H. Eibeshitz Institute for Holocaust Studies, 1998); Martin Parr and Timothy Prus, eds., *Łódź Ghetto Album* (London: Boot, 2004); Henryk Ross and Aleksander Klugman. *Darkam ha-a, Āaronah shel Yehude Lodz' [The Last Journey of the Jews of Łódź]* (Tel-Aviv S. Kibel: [196-?]); Janina Struk, *Photographing the Holocaust: Interpretations of the Evidence* (New York: I.B. Tauris, 2004).



Figure 6. Henryk Ross, “Negative Sheet Number 3, Frames 80-84”, Henryk Ross Łódź Ghetto Collection, Art Gallery of Ontario.



Figure 7. Henryk Ross, “Negative Sheet Number 3, Frames 80-84,” digitally inverted to positive image, Henryk Ross Łódź Ghetto Collection, Art Gallery of Ontario.

Photographers under the direction of the Jewish Administration were requested to document buildings and workers within the ghetto community, to showcase the hard work its inhabitants produced, and the manner in which the ghetto maintained itself as a functioning society. The images provided evidence of the efficient operation of Łódź Ghetto to German authorities, to maintain the existence of this labour facility. Photographic documentation found within this strip of negatives reveals the type of photographs recorded by the ghetto's photographers to meet the demands of the authority.

In the first frame of the selected strip, workers are tending to the ghetto hospital garden – a typical image commissioned by the Jewish Administration to illustrate the work and care taken to attend to this facility.

The third, fourth and fifth frames document a medical procedure performed by hospital staff, again

highlighting the work of these employees that would



Figure 8. Henryk Ross, “Negative Sheet Number 3, Frames 80-82”, detail, digitally inverted to positive image, Henryk Ross Łódź Ghetto Collection, Art Gallery of Ontario.

serve as documentary evidence for the Jewish Administration of the essential services executed by ghetto inhabitants (Figure 8). In contrast, the second frame, labelled 81, reveals a different perspective on life at the ghetto hospital by depicting a scarecrow found within the hospital gardens. This negative presents a more focused representation of the hospital garden, centering on a handmade scarecrow standing alone in the open space. The wooden structure is dressed with an old, tattered hat and coat, outstretched over the horizontal beam. Upon this coat, the Jewish

star has been stitched on the right breast. This humble figure, constructed by the Jewish workers within the ghetto, is a simple reminder of the treatment and isolation of the ghetto inhabitants. The image of the scarecrow shows a personal image captured by Ross, a record of how all things Jewish were treated. The contrast in subject matter reveals the juxtaposition between the scarecrow image and the hospital workers – the difference between Ross’ private and public images.

In determining the sequential order of the public and private images recorded on this strip, it appears as though the Jewish Administration may have tried to regulate the type of photographic documentation recorded; however, they did not monitor the rolls of film and their content. If this inspection procedure had taken place, the administrators would have witnessed the secret documentation performed by Ross, and most likely his photographic privileges would have been revoked, and ultimately, he could have been executed for his betrayal to the Jewish Administration and the German regime.³⁸

This selected sample of photographic negatives reveals the methodology and documentation practices of Henryk Ross during his time in the ghetto and his service to the Jewish Administration. Under the direction of the ghetto administrators, Ross was ordered to capture a particular type of photographic evidence as source documentation to reveal the essential services and outstanding work produced within this labour facility. Juxtaposed with these evidential views, Ross took the risk of recording all aspects of daily life, not just those that depicted hardworking ghetto inhabitants. He was in control of his negatives and the content he

³⁸ Martin Parr and Timothy Prus, eds., *Łódź Ghetto Album* (London: Boot, 2004), 27.

recorded, as the Jewish Administration was not aware of his secret documentation, and as a result, Ross was ultimately able to bury and preserve his personal images.

The Reorganization of the Single Frame

Based upon the photographing methods adopted by Ross – capturing publicly requested imagery for the Jewish Administration alongside private documentation of Jewish life as a personal record – an examination of the post-production editing and cataloguing methods undertaken by the photographer will further assist in the reading and comprehension of this negative collection.

In 1987, Ross set out to catalogue his collection of negatives, and in turn cut, sequenced and numbered individual frames within catalogued negative sleeves.³⁹ According to Ross, “The negatives I made I have put in order, catalogued, and provided explanations. These descriptions I was able to make with the help of my wife Stefania ... It is forty-two years since the Łódź Ghetto was liquidated so there may be some small inaccuracies in the chronology.”⁴⁰ Within the collection, some negative sleeves contain one complete roll of film, while most contain several different film types and various subject matter.

The selected sample for analysis, Negative Sheet 2, contains a variety of negative frames depicting various subjects (Figures 9 and 10). In this one negative sheet, 17 individual strips are present, ranging from single negative frames, to strips containing five negative frames. These single frames comprise the first samples in this negative sheet, with a total of nine individual frames recording images of ghetto postage stamps. These frames document the administrators of

³⁹ Martin Parr and Timothy Prus, eds., *Łódź Ghetto Album* (London: Boot, 2004), 27.

⁴⁰ *Ibid.*, 27.



Figure 9. Henryk Ross, "Negative Sheet Number 2", Henryk Ross Łódź Ghetto Collection, Art Gallery of Ontario.

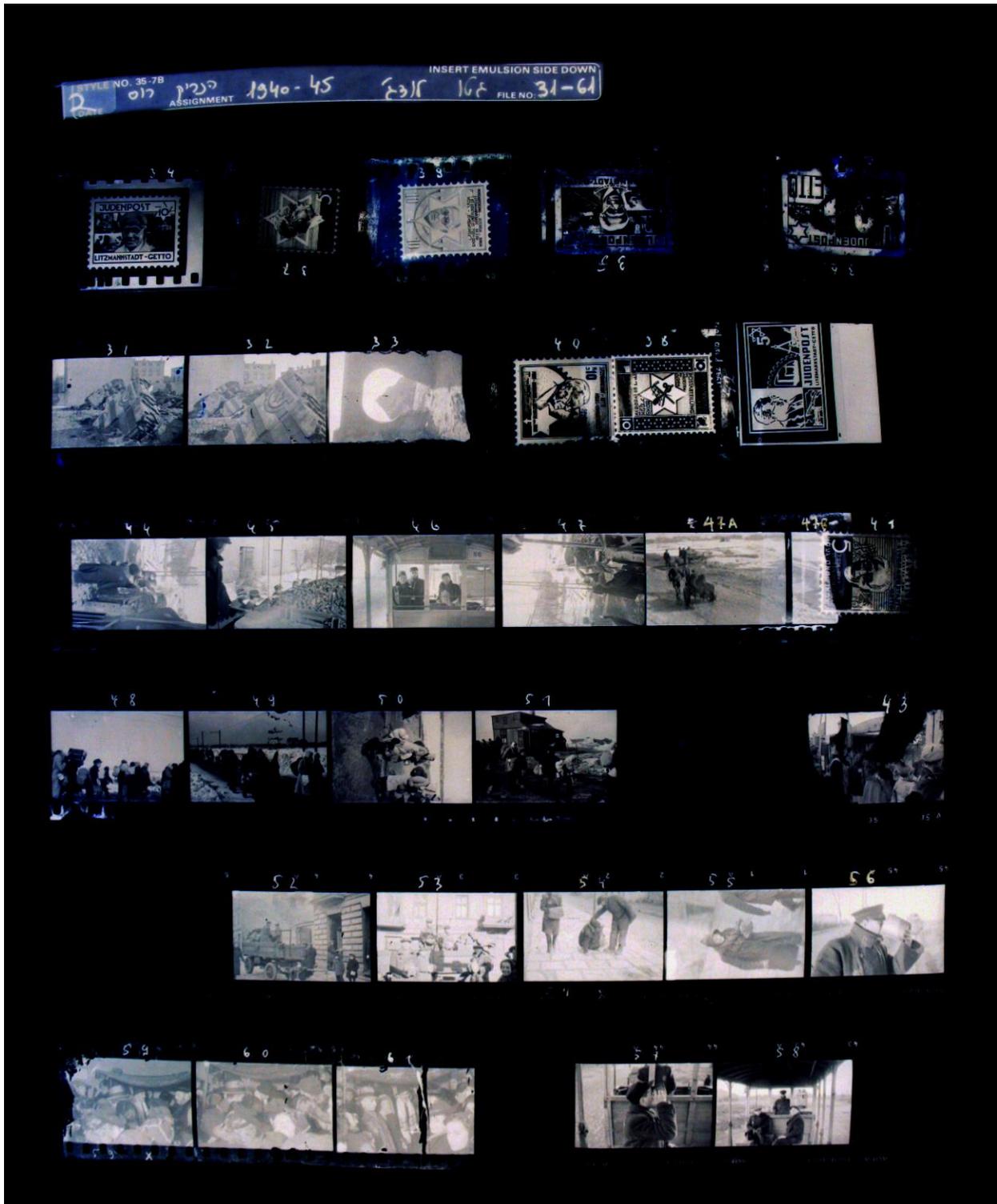


Figure 10. Henryk Ross, "Negative Sheet Number 2", digitally inverted to positive image, Henryk Ross Łódź Ghetto Collection, Art Gallery of Ontario.



Figure 11. Henryk Ross, “Negative Sheet Number 2, Frame 32”, detail of synagogue, digitally inverted to positive image, Henryk Ross Łódź Ghetto Collection, Art Gallery of Ontario.

the ghetto, with portraits of the Jewish Administrator, Chaim Rumkowski. The next set of three negative frames, labeled 31-33, document the remnants of a Jewish synagogue after it was destroyed under German rule (Figure 11). The following strip, containing five frames labeled 44-47B, depicts coal transportation, including images of workers and administrators responsible for this process. The strip of four frames labeled 48-51, documents deportation from the ghetto (Figure 12). In these images, inhabitants in the ghetto have packed their

belongings and are headed to the train for deportation. Another representation of deportation is also documented in the single negative frame labeled 43, as well as the strip of five negative frames labeled 52-56. Contrasting in subject matter, the strip of three frames labeled 59-61 documents images of Henryk Ross’ wedding to his wife Stefania. The final strip, labeled 57-58, reveals two images of people aboard a form of transportation, possibly an automobile or railroad car.



Figure 12. Henryk Ross, “Negative Sheet Number 2, Frame 48”, detail of deportations, digitally inverted to positive image, Henryk Ross Łódź Ghetto Collection, Art Gallery of Ontario.

By examining the subject matter documented on the individual negative frames contained within this one sheet, it appears as though Ross has completed extensive editing, cataloguing, grouping and sequencing. The combination of subjects represented in this sheet leads to Ross’ creation of a visual narrative through individual images, rather than the narrative created in a sequential roll of film. By combining small pieces of various stories – administrators,

destruction, transportation, and celebrations – Ross has created mini-narratives of various events, separating them from the other images captured at their time of exposure. Due to this editing, it is difficult to piece together the actual sequence in which images were photographed, and the methodology in which he used during the act of photographing.

From this regrouping of images prepared at a later date, it can be noted that the original arrangement of negatives did not present the narrative which Ross remembered. As a result, he has separated the images to report the event as he saw fit. According to Ross, “I was anticipating the total destruction of Polish Jewry. I wanted to leave a historical record of our martyrdom.”⁴¹ Ross has selected and combined images of like subject matter to illustrate the martyrdom of the Jewish people. The shaped narrative as seen through the arrangement created by Ross represents small accounts of events, people, places and items within the ghetto, illustrating a larger representation of ghetto life based upon his memory of the oppression and discrimination of the Jewish people.

The idea of presenting information through editing and sequencing can be traced to Ross’ roots as a photojournalist, and his ability to edit the images to tell a story. The negatives as originally captured did not characterize the details as Ross remembered, and as stated in his own words, he has put them into a particular order with explanations and descriptions as not only remembered by himself, but also contributions provided by his wife based on her memory of the events witnessed. Ross also admits that “there may be some small inaccuracies in the chronology” within his catalogue of negatives, however, the chronology of many of the

⁴¹ Martin Parr and Timothy Prus, eds., *Łódź Ghetto Album* (London: Boot, 2004), 27.

catalogued images can not be verified due to their rearrangement and the inability to reconstruct the events as they actually occurred by rebuilding a roll of negative frames.⁴²

The editing and sequencing created within the negative collection can be defined as a process of recording versus chronicling knowledge. Ross recorded life in the ghetto as he witnessed through the lens of the camera, but later reshaped the recorded material into an order that made sense to him. The later cataloguing efforts instituted by Ross affect the understanding of documented events based upon his vision, rather than interpreting the original sequence of events depicting life as it happened.

⁴² Martin Parr and Timothy Prus, eds., *Łódź Ghetto Album* (London: Boot, 2004), 27.

THE DISSEMINATION OF ROSS' IMAGES

Rereading Darkam ha-a,Æaronah shel Yehude Lodz' (The Last Journey of the Jews of Łódź)

In addition to the chronological arrangement formed by Ross through the act of sequencing and cataloguing the negative collection, the notion of using photographic images to develop a narrative through dissemination is also present in Ross' 1960s book publication, *Darkam ha-a,Æaronah shel Yehude Lodz' (The Last Journey of the Jews of Łódź)*. The images selected for this book reflect a record of martyrdom for the Jewish people as determined by Ross, depicted through a series of sequenced photographs representing the death and destruction witnessed within the walls of Łódź Ghetto. Examination of the photographic content in this publication presents a different account when compared to the narrative created through his sequenced negatives.

A photobook incorporates photographs and often text to present a specific subject or theme. According to Martin Parr and Gerry Badger, in their publication titled *The Photobook: A History*, “a group of photographs is brought together between covers, each image placed so as to resonate with its fellows as the pages are turned, making the collective meaning more important than the images' individual meanings.”⁴³ In the case of *Darkam ha-a,Æaronah shel Yehude Lodz'*, Ross is not only photographer but also the author, assembling page layouts and sequences to represent his personal view of the documented imagery. Following World War II, those involved in the conflict deemed “the first task of photography was ... to provide visual evidence of the Holocaust ... In this way photography and the photobook bore powerful and irrefutable

⁴³ Martin Parr and Gerry Badger, *The Photobook: A History, volume 1* (London; New York: Phaidon, 2004), 7.

witness to what had happened in Nazi-occupied countries, informing a shocked, almost disbelieving, world.”⁴⁴ Based upon the idea of a photobook as a witness to events, Ross selectively compiled his imagery to form a narrative that would present the atrocities of life in the ghetto for observers of the outside world. After the war’s end, accounts of events that occurred during Hitler’s rule were presented through the histories of survivors and witnesses, and became the accepted views of the Holocaust and the Nazi regime. Ross’ book publication is yet another form of dissemination that represented these accepted views, choosing images of devastation to convey this interpretation of history. Following the acknowledged representation of the time, and with his original premise in mind, Ross could present his record of martyrdom for the Jewish people as he had intended, by selecting images to best illustrate these ideas through a visual narrative.

Ross’ *Darkam ha-a, Aaronah shel Yehude Lodz*’ is a slim, 84-page publication bound in a simple black cover with pressed silver lettering. The book, reading back to front, begins with a title page and front matter, as well as an introduction written in six different languages, revealing the attempt to present this publication for international audiences, that all might understand the photographic records and documents provided within the book. Following this text, begins the sequencing of images with accompanying captions, also provided in six languages. The 165 black and white photographs included within the publication are presented as single images on a page, or combined with other images to create a double page layout. Some are presented with white borders surrounding the images, while others are formed into montage compositions to illustrate a particular subject through many photographic examples, such as work duties, starvation or deportation.

⁴⁴ Martin Parr and Gerry Badger, *The Photobook: A History, volume 1* (London; New York: Phaidon, 2004), 188.

To examine the narrative depicted in Ross' 1960s publication, a sample image and its corresponding layout within the book have been selected for analysis (Figure 13). This image, found on page 28 in the lower left corner, depicts a young boy lying on a street sidewalk, clutching a door in his left hand.⁴⁵ The boy appears to be weak from starvation. Due to the tight cropping, he is seen on the sidewalk by himself, faced with suffering and left for dead. In greater context within the publication, this selected image resides on a two-page spread with five other images, each depicting suffering through hunger and starvation, accompanied by the caption, "People drained of their last strength" (Figure 14).⁴⁶

Upon closer examination, the selected image of the boy appears cropped to a square format, when the image was captured on a 35mm negative, with an aspect ratio of 3:2 (Figure 15). In this case, the image recorded on the negative would be rectangular, providing additional information of the boy's surroundings. The negative for this image can be found within Negative Sheet 9, a single negative frame cut from its original arrangement within a complete strip (Figures 16 and 17). This negative reveals a great deal of added context regarding the situation in which the image was captured. In the left foreground, another boy is present, standing and looking at the photographer. The top right background also reveals another witness, only visible by the cropped body captured in the image.

This entire scene creates a very different understanding of the scenario in which the image was captured. The boy lying on the street in hunger was not alone, left to perish on the

⁴⁵ Henryk Ross and Aleksander Klugman. *Darkam ha-a, Aeronah shel Yehude Lodz' [The Last Journey of the Jews of Łódź]* (Tel-Aviv S. Kibel: [196-?]), 28.

⁴⁶ *Ibid.*, 27.

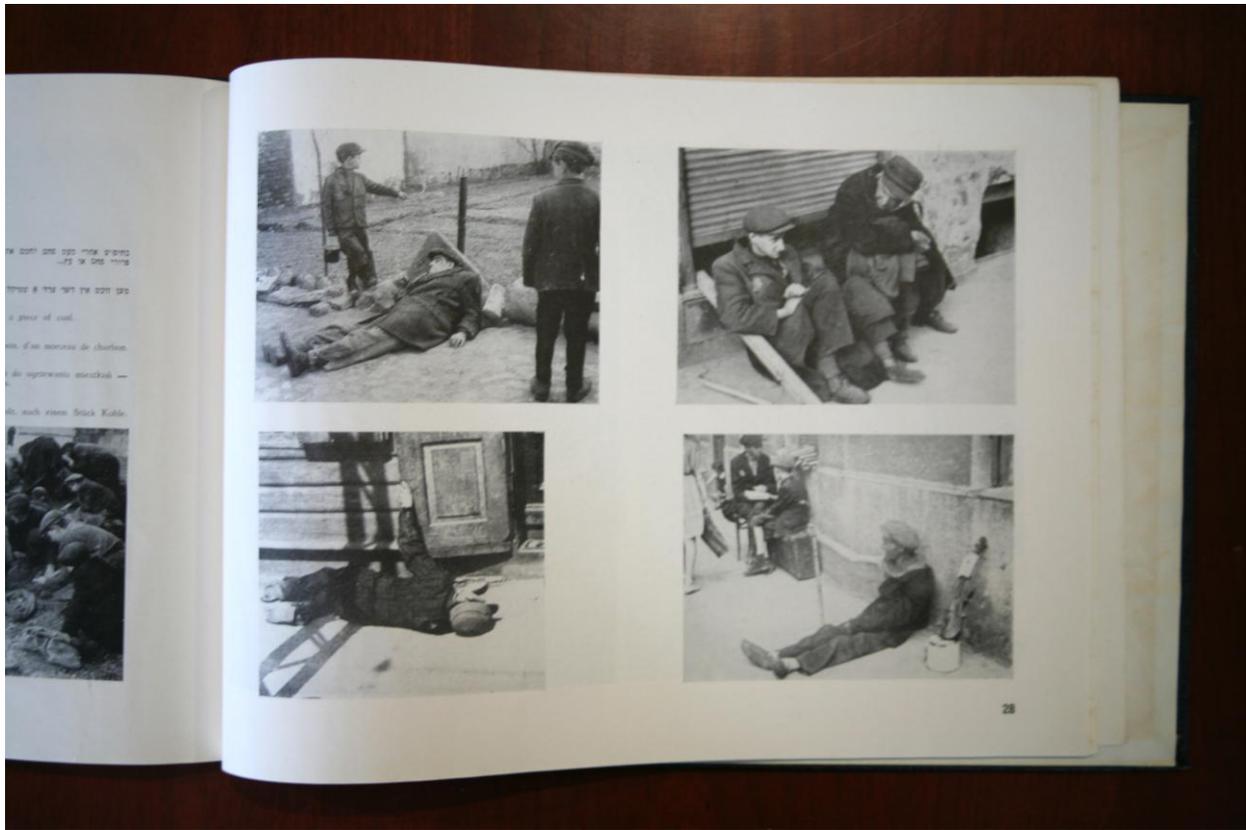


Figure 13. Henryk Ross, page 28 from *Darkam ha-a, Aeronah shel Yehude Lodz'* (*The Last Journey of the Jews of Łódź*), Henryk Ross Łódź Ghetto Collection, Art Gallery of Ontario.

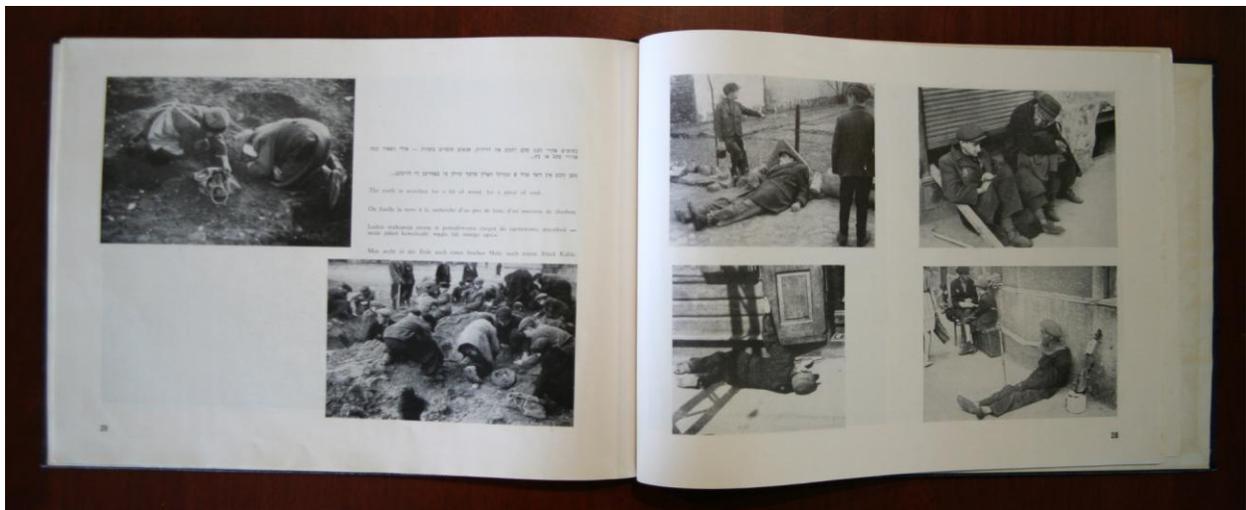


Figure 14. Henryk Ross, pages 28 and 29 from *Darkam ha-a, Aeronah shel Yehude Lodz'* (*The Last Journey of the Jews of Łódź*), Henryk Ross Łódź Ghetto Collection, Art Gallery of Ontario.



Figure 15. Henryk Ross, detail of page 28 from *Darkam ha-a, Aeronah shel Yehude Lodz'* (*The Last Journey of the Jews of Łódź*), Henryk Ross Łódź Ghetto Collection, Art Gallery of Ontario.

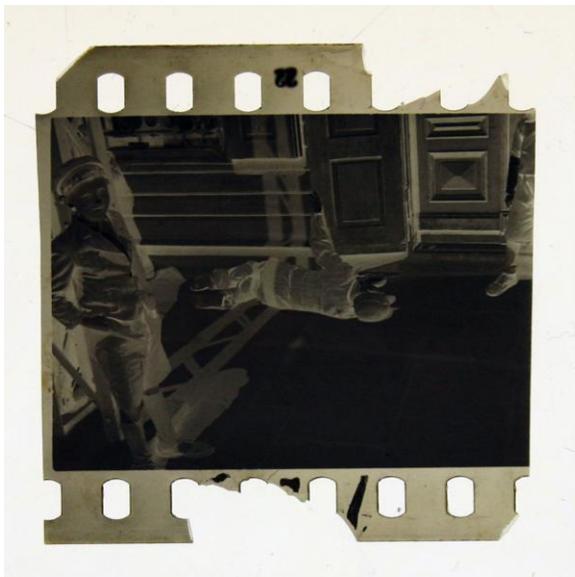


Figure 16. Henryk Ross, “Negative Sheet Number 9, Frame 22”, Henryk Ross Łódź Ghetto Collection, Art Gallery of Ontario.



Figure 17. Henryk Ross, “Negative Sheet Number 9, Frame 22,” digitally inverted to positive image, Henryk Ross Łódź Ghetto Collection, Art Gallery of Ontario.

sidewalk. Instead, others were present and witness to this act, resulting in a more dramatic image. The full frame image reveals details of life in the ghetto, where inhabitants within the ghetto walls were forced to live with the people around them dying. The blank expression on the face of the boy in the foreground reveals the normalcy of this element of daily life, where neighbours succumbed to their starvation and weakness, perishing in the streets among the living

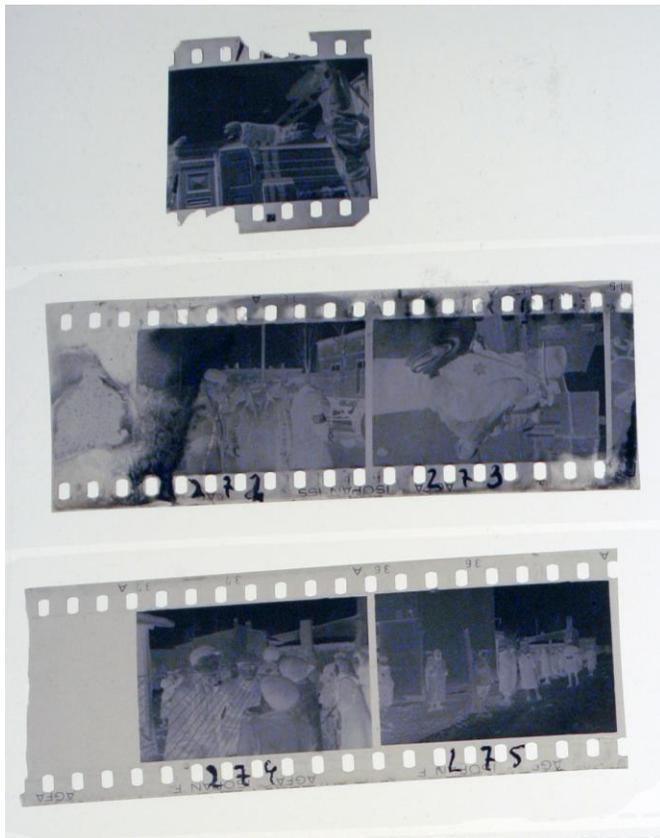


Figure 18. Henryk Ross, “Negative Sheet Number 9, Continued”, Henryk Ross Łódź Ghetto Collection, Art Gallery of Ontario.

that went about performing their required duties. By cropping the image to include only the fallen boy, Ross has shaped the reading of the image to evoke emotional attachment from the viewer.

As previously mentioned, the negative which documents this image resides in a negative sheet labeled Sheet 9. While a complete sheet of negatives identified as Sheet 9 exists, this single negative along with two other negative strips have been placed in a second sheet, also labeled Sheet 9 (Figure 18). The only

negative in the first row within the sheet is the negative of the boy. It has been cut from other negative frames, separated from other images of similar subject matter, or the chronological events that occurred before and after this image was captured. The separation of this negative from others suggests the image was deemed important by Ross as a stand-alone photograph,

presenting a symbolic representation of ghetto life through this single image. By segregating the negative, Ross has raised the status and importance of the image represented, realizing the significance and iconic quality of the recorded document.

In accordance with Ross' photojournalism experience, and his desire to produce a separate narrative rather than adhering to the chronological documents originally captured on a roll of film, it appears as though the full frame image of the boy did not adhere to the type of account Ross was trying to achieve through his photographs. As a result, he organized a layout of photographs that when situated on the same page, proposed a sequence of lonely victims suffering from starvation and death. Additional editing techniques such as cropping assisted in reinforcing this theme in which he was trying to transmit, within the larger context of the "record of martyrdom" narrative produced within this book publication.

Rereading Łódź Ghetto Album

A second book publication also addresses the photographic works of Henryk Ross during his time in Łódź Ghetto. Created in 2004 by the Archive of Modern Conflict, *Łódź Ghetto Album*, contains images from the Ross collection selected by Martin Parr and Timothy Prus, a foreward by Robert Jan Van Pelt, and text by Thomas Weber.⁴⁷ This publication is the first to completely address this photographer's entire body of work, providing an independent look at Ross' ghetto photographs.

As opposed to the creation of a photobook with the photographer as author, *Łódź Ghetto Album* contains images chosen and compiled by editors. Based upon found imagery created by another artist, this publication deals with presenting a body of work by a then deceased photographer, and shedding new light upon the documented subject matter.⁴⁸ According to Parr and Badger in *The Photobook: A History*, "the author's task is not one of creating the photographs, but of selection and ordering, giving a new and potent voice to the material of others, especially when the original voice has become muted by time or neglect."⁴⁹ Ross' photographic archive received no immediate recognition after the end of the Second World War, and has only recently been viewed by the general public. In order to present the materials from the collection, the idea of reorganization and 'revisionism' was adapted by the editors to better reveal the complexities of this historical period.

⁴⁷ Martin Parr and Timothy Prus, eds., *Łódź Ghetto Album* (London: Boot, 2004).

⁴⁸ Henryk Ross died in Israel, in 1991. Martin Parr and Timothy Prus, eds., *Łódź Ghetto Album* (London: Boot, 2004), cover.

⁴⁹ Martin Parr and Gerry Badger, *The Photobook: A History, volume 1* (London; New York: Phaidon, 2004), 8.

In this 160-page publication, editors Parr and Prus have presented Ross' photographic work through book format. The hardcover volume presents text written by Thomas Weber outlining the history of the Ross collection, and the circumstances under which the collection came to exist, as well as outlining the scope and concept behind the presentation of images. Following this text is the plate section titled "The Photographs", including 120 images separated into two subsections, "Public" and "Private". The first set of black and white reproductions represent public images, not unlike those published in Ross' 1960s book. After these images are the private representations, the first opportunity for viewers to see this contrasting component of the Ross collection. The layouts within each section depict full-frame reproductions of selected photographs, one to a page surrounded with white borders or enlarged to stretch across the book's gutter and fill a double page spread. Captions for the images are also provided, cited from Ross' original catalogue if available, or where required, suitable descriptions provided by Thomas Weber.⁵⁰

The task set forth by the editors of this recent publication involved examining the photographic content of the collection to "encourage alternative readings of ghetto society and its leadership, class system and solidarity in the face of violence."⁵¹ Through their selection of images, Parr and Prus have created the first attempt to better understand this complex body of work through the process of editing the collection's contents into a book publication. To do this, the editors have chosen examples of Ross' work and divided them into two distinct categories. According to the editors, "the 'public' section features photographs that Ross released during his

⁵⁰ Martin Parr and Timothy Prus, eds., *Łódź Ghetto Album* (London: Boot, 2004), 27.

⁵¹ *Ibid.*, 9.

lifetime, along with previously unpublished photographs that are similar to or from the same sequences as those released by Ross.” The second portion comprised of private images, are those that depict the happier moments of life within the ghetto have had not been previously published.⁵² With these defined parts, editors Parr and Prus have categorized Ross’ images into two distinct groups.

The separation of public and private images can be observed when analyzing the photographic content of the Ross collection; however, this book publication does not address the entire collection. Due to the constraints of the book format, a method of photographic dissemination which cannot encompass the entire 3,000 negatives, the editors were required to create a selection of photographs for publication that would best represent the collection. In doing so, Parr and Prus have created another form of narrative based upon these chosen images. In Ross’ 1960s publication, the photographer created a book using photographs to present a narrative of death and devastation experienced by the Jewish people within Łódź Ghetto. Parr and Prus, on the other hand, have attempted to produce a book that encompasses a broader view of life in the ghetto, by presenting both private and public imagery. This idea is acknowledged by Matthias Tronqual, a historian of Holocaust photographic representations, who through his review of this publication, recognizes the editors’ attempt to show a more complex reality of life in the ghetto, and the capacity of these images to examine a particular period in history.⁵³ The underlying theme is perhaps not as restricted as that created by Ross in the 1960s publication, but

⁵² Martin Parr and Timothy Prus, eds., *Łódź Ghetto Album* (London: Boot, 2004), 27.

⁵³ Tronqual, Matthias. “Chris BOOT (éd.), *Łódź Ghetto Album*, texte de Thomas Weber et Robert Jan van Pelt, Londres, Archive of Modern Conflict, 2004, 157 p.,” *Études Photographiques*, 17 (November 2005), <http://etudesphotographiques.revues.org/index767.html> (accessed May 27, 2010).

their selection has limited the images published to reveal the story that the editors deemed important.

By separating Ross' photographic work into two distinct sections – public and private – editors Parr and Prus have instituted a strong editorial decision, influencing the interpretation of the work. Each exists as a stand-alone portion, never amalgamating content from either part. As such, the reader or viewer of this publication recognizes the photographs as two distinct bodies of work. As revealed in earlier analyses within this thesis discussion, Ross was photographing both public and private imagery at the same time. Individual negative strips illustrate this fact within sequential negative frames.

The act of photographing public and private images simultaneously can be illustrated through the analysis of a negative strip sample from Negative Sheet 43 (Figures 19 and 20). In a strip of six negative frames, labelled 471 to 476, images depicting public and private events are revealed. The first four frames document a large group photograph of men, most likely officials within the ghetto as deduced by their uniform and identifying arm band. The fifth frame records an individual portrait of a young girl standing alone, while the sixth frame captures the posed image of a man in uniform (the same as those worn in the group photograph), along with a woman and young boy. Based upon this strip and others within the collection like it, the act of recording photographs from these two distinct categories occurred simultaneously. By separating the images into independent groupings, the editors gave the readers the impression that through the production of Ross' photographic images and the realities of life within the ghetto, the private and public images were two individual bodies of work.

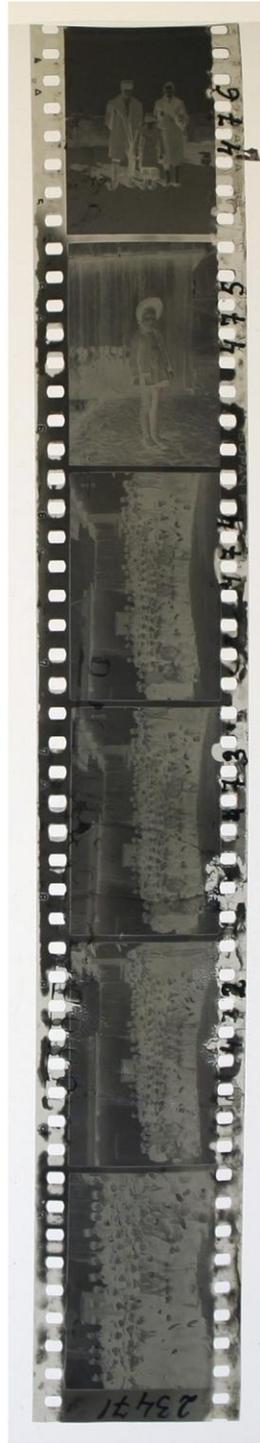


Figure 19. Henryk Ross, "Negative Sheet Number 43, Frames 471-476", Henryk Ross Łódź Ghetto Collection, Art Gallery of Ontario.

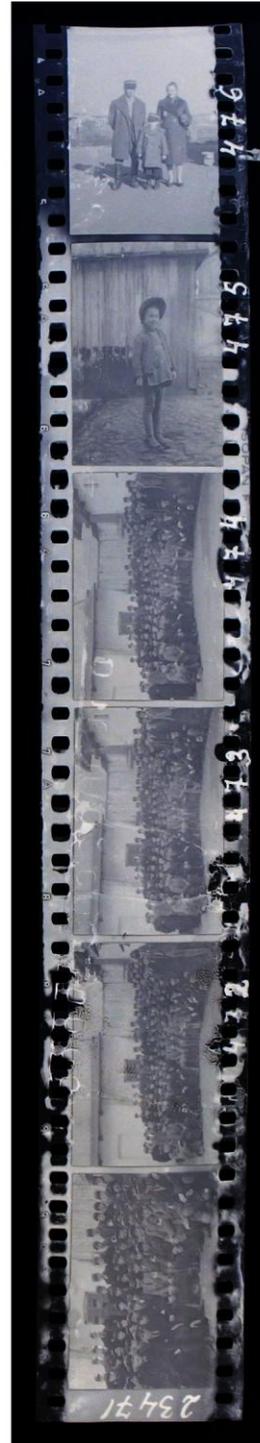


Figure 20. Henryk Ross, "Negative Sheet Number 43, Frames 471-476," digitally inverted to positive image, Henryk Ross Łódź Ghetto Collection, Art Gallery of Ontario.

To continue the examination of this book, an analysis of additional images published leads one to question the division of images into two categories. On page 66 of *Łódź Ghetto Album*, an image captioned “Management of the hospital kitchen” reveals a posed group photograph of men and women employed at the hospital at 36 Lagiewnick Street (Figure 21).⁵⁴ People documented in this portrait are facing the camera, making eye contact with the photographer, and in several cases smiling while the picture was recorded. This photograph is placed in the “Public” section of the book, while another similar image resides on page 133, in the “Private” category (Figure 22). In this image, captioned “Telephone exchange workers in the ghetto,” the photographer documents three women and two men employed in the telephone office, posing again for a group portrait.⁵⁵ The subjects in this photograph are also facing the camera, and in most cases smiling at the photographer. The recorded content of these two images are very similar in nature, yet they have been separated into two contrasting categories.

In order to explain why these images were placed into their respective sections, an examination of the negative strips on which they were recorded reveals further context into the type of imagery documented before and after the selected photographs. In the case of the image on page 66, the original negative can be found on Negative Sheet 24, labeled 1069 (Figures 23 and 24). The four frames recorded before the image document men and women signing papers, probably an official image of significant events or personalities within the ghetto, while the image frame after negative 1069 is a second exposure of the same scenario of posed hospital kitchen management. Each of the images recorded on this strip documents what could typically

⁵⁴ Martin Parr and Timothy Prus, eds., *Łódź Ghetto Album* (London: Boot, 2004), 66.

⁵⁵ *Ibid.*, 133.



Figure 21. Henryk Ross, page 66 from *Łódź Ghetto Album*.



Figure 22. Henryk Ross, page 133 from *Łódź Ghetto Album*.



Figure 23. Henryk Ross, "Negative Sheet Number 24, Frames 23065-1070", Henryk Ross Łódź Ghetto Collection, Art Gallery of Ontario.



Figure 24. Henryk Ross, "Negative Sheet Number 24, Frames 23065-1070," digitally inverted to positive image, Henryk Ross Łódź Ghetto Collection, Art Gallery of Ontario.



Figure 25. Henryk Ross, “Negative Sheet Number 29, Frames 22907-911”, Henryk Ross Łódź Ghetto Collection, Art Gallery of Ontario.



Figure 26. Henryk Ross, “Negative Sheet Number 29, Frames 22907-911,” digitally inverted to positive image, Henryk Ross Łódź Ghetto Collection, Art Gallery of Ontario.

be categorized as public photographs, and as such, seem appropriately placed within the “Public” section.

The photographic image published on page 133 is found within a strip of negatives from Negative Sheet 29, labeled 909 (Figures 25 and 26). The first three frames within this strip document the telephone exchange workers, first the two men alone, and then the entire group of men and women. The images appear official in nature, recording the workers within this department on the ghetto. The final two images on the strip capture a group of young men and women, possibly friends, posing outdoor in an amiable and sociable setting. These final two images on the strip represent private images, contrasting the other more official photographs on this strip. The dissimilarity in the recorded images on this strip poses the question as to how the editors deemed each of the published photographs to be either public or private. Perhaps their editing decisions were impacted by the images recorded before and after the selected photograph, and the two categories are not as distinct as one might understand from the publication.

The ability to separate Ross’ photographs into two sections is an act of editing that even the photographer could not completely address through his post-production cataloguing efforts. Through an examination of Negative Sheet 10, two images published in *Łódź Ghetto Album*, in both categories, can be found not only on the same negative page, but in the same row within the sheet. Negative 302, found on page 29 and captioned as “The ‘Aryan’ street – Zigerska – cuts the ghetto in two,” captures a wooden bridge structure above a ghetto street, linking one side of the ghetto to the other (Figures 27- 29).⁵⁶ Two frames to the right of 302 is the negative labeled 300,

⁵⁶ Martin Parr and Timothy Prus, eds., *Łódź Ghetto Album* (London: Boot, 2004), 29.



Figure 27. Henryk Ross, “Negative Sheet Number 10, Frames 299-301”, Henryk Ross Łódź Ghetto Collection, Art Gallery of Ontario.

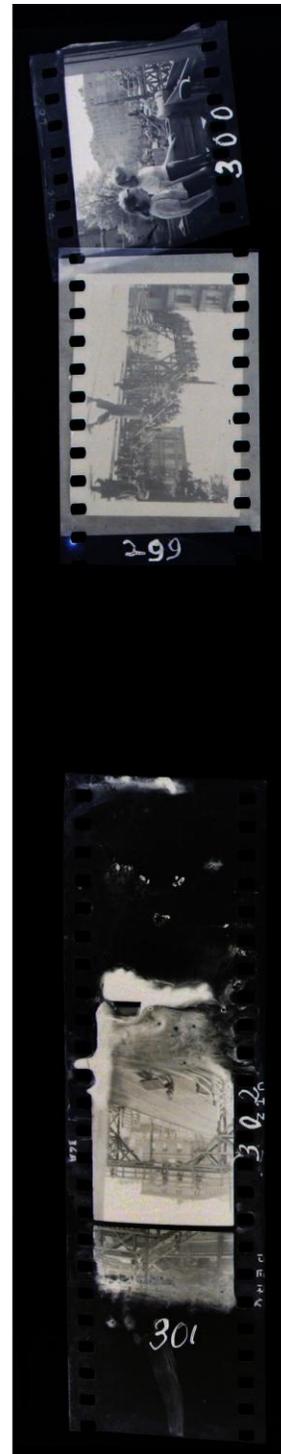


Figure 28. Henryk Ross, “Negative Sheet Number 10, Frames 299-301,” digitally inverted to positive image, Henryk Ross Łódź Ghetto Collection, Art Gallery of Ontario.

found on page 114-115 of the book with the description, “This wooden bridge at Koscielny Square (Church Square) crossing Zigerska, the ‘Aryan’ street that cut through the ghetto – identified as likely to have been photographed from the building of the Statistics Department of the Jewish Council, Ross’s employers,” showing two women looking out into the ghetto (Figures 27-28, 30).⁵⁷ The women in this photograph appear posed, as Ross captures a private portrait of them, within a public space. While Ross understood the difference in subject matter recorded in these images – one being a document of the structure, and the other a portrait of two women – he still chose to group them together, perhaps because they recorded the same area of the ghetto, and could be linked by their subject matter. Separating Ross’ imagery into two distinct categories can assist in understanding the body of work, but the intricacies associated with this division can be as complex as the subject matter he recorded.

This more recent and independent analysis of Ross’ collection by Parr and Prus presents a more encompassing examination of the body of work created by Ross, but it also produces another layer of narrative associated with the interpretation of photographic imagery. The editors of this publication should be commended for their work, as the first to present a publication addressing the vast content of photographic imagery within the collection, and have made an attempt to help the public understand the complexities of the subject matter recorded. While this publication format of Ross’ photographs has led to further awareness of this rare collection, studying the negatives as historical documents in conjunction with the published images further assists in grasping the appreciation of this collection’s historical relevance.

⁵⁷ Martin Parr and Timothy Prus, eds., *Łódź Ghetto Album* (London: Boot, 2004), 115.

MAKING HISTORY POSSIBLE: PRESERVATION OF THE ŁÓDŹ GHETTO COLLECTION

It can be said that the Henryk Ross Łódź Ghetto negative collection is a significant body of work, and as such, should be maintained and preserved to ensure its longevity. Currently, the negative collection resides in three linen-covered clamshell boxes, with most of the negatives in their original acetate sleeves. Based upon the burn test results and the instability of nitrate based film, issues of deterioration and degradation must be quickly addressed to conserve these original documents.

To represent the materials found within the negative collection, Negative Sheet 5 presents a sample which contains various negative specimens with varying degrees of deterioration (Figure 31). Within this negative sheet, four different film types are found: Isopan F, Isopan ISS, Opta, and Kodak AG Plus X Panchro. While all are cellulose nitrate based, their rate of deterioration differs. Upon completion of controlled burn tests to identify nitrate substrates, it was determined that the Opta sample (the third negative strip in the sheet, outlined in red) had burned the most quickly when in contact with the flame.⁵⁸ Due to the extremely flammable nature of this single strip of negatives, the other negative samples within this sheet (as well as the rest of the collection) are subject to damage if the Opta sample were to come into contact with a flame, or unpredictably combust. As a result, specific measures must be implemented in order to preserve all of the original negative samples, apart from the other paper components of this collection.

⁵⁸ This observation was determined during the burn tests conducted January 20, 2010 with the Art Gallery of Ontario's Conservator of Photographs, Katharine Whitman.



Figure 31. Henryk Ross, “Negative Sheet Number 5”, red box highlighting Opta film sample, Henryk Ross Łódź Ghetto Collection, Art Gallery of Ontario.

Due to the specific deterioration characteristics associated with cellulose nitrate film, detailed precautions should be acknowledged and implemented for safe storage practices. Nitric acid produced by degrading negative bases can cause harm to neighbouring objects in the collection. Therefore, cellulose nitrate film should be separated and removed from the collection, and stored in an independent, sealed area.⁵⁹ Archival practices advise that nitrate negatives be housed in archival acid-free paper enclosures, as they act as a humidity buffer, allow for the escape of gas build-up that may occur over time as the object deteriorates, and can assist in neutralizing external pollutants.⁶⁰ In addition to re-housing the individual negatives in paper enclosures, the entire collection should undergo a complete reconfiguration of the storage environment. The deterioration of nitrate film can be accelerated by elevated levels of temperature and humidity, and as such need to be monitored very closely. Chemical reactions are accelerated by an increase in temperature, so cold storage is highly recommended as a long term housing option. Maximum values of 2°C and 20-30% relative humidity are ideal conditions in which to store nitrate negative collections.⁶¹ The collection's contents should be contained in an archival box, sealed within a archival polyester storage bag, and housed in a frost-free freezer.⁶² Placing the Ross negative collection within a cold storage environment would ultimately impact the availability of the collection's contents for research, but would sustain the existence of these original historical documents.

⁵⁹ Tony Knapp and Diane Vogt-O'Connor, "Caring for Cellulose Nitrate Film", in *Conserve O Gram August 2004 Number 14/8* (NPS Museum Management Program, 2004), 2.

⁶⁰ Bertrand Lavédrine, *A Guide to the Preventive Conservation of Photograph Collections*, ed. Jean-Paul Gandolfo, Sibylle Monod, and Getty Conservation Institute, trans. Sharon Grevet (Los Angeles: Getty Conservation Institute, 2003), 54.

⁶¹ *Ibid.*, 96.

⁶² Tony Knapp and Diane Vogt-O'Connor, "Caring for Cellulose Nitrate Film", in *Conserve O Gram August 2004 Number 14/8* (NPS Museum Management Program, 2004), 2.

At this time, frozen storage is not an option at the Art Gallery of Ontario. Although it is currently deemed a future endeavour for the conservation of photographic objects, the reality of this storage option lies within future funding for the collecting institution. Due to the immediacy of re-housing and storage for the Ross collection, alternative options have been proposed. To ensure the safety and prolonged existence of this unique collection, a flammable storage proposal has been submitted to the Art Gallery of Ontario's director, photography curator and conservator. This proposal outlines the appropriate fire codes existing within the province of Ontario as outlined in the Office of the Ontario Fire Marshal fire code under the Ontario Fire Protection and Prevention Act, and the National Fire Protection Association (NFPA) 40: Standard for the Storage and Handling of Cellulose Nitrate Film (see Appendix: *Ontario Fire Protection and Prevention Act* and Appendix: *National Fire Protection Association (NFPA) 40*).⁶³ These regulations outline construction specifics for fireproof storage cabinets, and three possible cabinets have been determined which meet the noted specifications (see Appendix: *Product Data Sheets*). By instituting flammable storage cabinets, along with re-housing the collection in appropriate archival paper enclosures, the negative portion of the collection can be properly cared for to assist in the survival of these historical objects.

A re-housing initiative for the Ross negative collection proposes certain logistical issues regarding the documentation of original notations recorded by the photographer on the objects themselves. The negative sleeves all contain hand-written labels and identifiers associated with each roll of film and subsequent image frame. The markings found on the original negative

⁶³ Ministry of Community Safety and Correctional Services, Office of the Fire Marshal, *Fire Code (2007 Edition)*, Ontario Regulation 213/07, May 25, 2007, http://www.e-laws.gov.on.ca/html/source/regs/english/2007/elaws_src_regs_r07213_e.htm (accessed April 14, 2010); National Fire Protection Association, *NFPA 40: Standard for the Storage and Handling of Cellulose Nitrate Film*, 2001.

sleeves are fundamental in understanding the cataloguing of Ross' images, along with the sequencing of frames within the sleeve. Each of these areas must be accounted for in order to maintain this source information. Written and photographic documentation should be observed before re-housing plans proceed, ideally electronically scanning each object for digital reference. Digitizing this collection is a large endeavour, but will assist in allowing further study of the collection's contents if strict storage procedures are implemented in the future.

The Henryk Ross Łódź Ghetto negative collection is a rare compilation of photographic evidence from a crucial period in the history of humanity. It is remarkable that the collection's contents have maintained their existence over the past 65-70 years, including the tremendous salvage effort early in their survival. These facts should not be disregarded when looking to the future preservation of this collection. The historical documents recorded on film have only been available for study in the past decade, where scholars and researchers could have access to this unique collection. To ensure future exploration and critical analysis of these recorded documents, conservation plans must be observed in order to maintain and preserve Ross' historical objects for future generations.

CONCLUSION

Through an analysis of the Henryk Ross Łódź Ghetto Collection, the reassessment of this compilation of artifacts has provided new insight into Ross as a photographer and editor, as well as shed light on the historical value of his photographic negatives. By closely examining not only the physical materials which comprise the collection, but the subject matter documented on individual negative strips, Ross' photographic processes reveal the working conditions overcome to create a collection, the methodology employed by the photographer to capture his images, and the narrative in which he shaped the photographs to relay the story of the Łódź inhabitants. Ross' Łódź Ghetto Collection holds a wealth of historical information through photographic evidence, and the understanding and interpretation of these documents depends on who approaches the materials and how they are analyzed. Although this thesis only examines a particular portion of the Łódź Ghetto Collection, its aim is to aid in understanding the importance of the negative as a historical document and a source for research.

The complexities associated with researching the negative – its small scale, inverted tonalities, and difficulty to display – present a body of work that without interpretation, remains irrelevant. The negatives require analysis and examination to present a history of the collection. This particular collection holds a great deal of importance within the history of humanity, but also provides a rich history of the photographic document. These are the histories that this thesis has attempted to explain.

To study the collection, samples were selected to best represent the elements outlined in the analysis portion of this paper. While many other examples exist within the collection, those chosen were made as relevant as possible to the areas of discussion. The analysis aimed to understand the negative as a historical document which one could use as a research tool to appreciate and comprehend a particular body of work. This thesis has only scratched the surface of this intricate collection, leaving a great deal of knowledge left to be discovered. Through the use of digital technologies, individual negative frames and strips could be pieced together to create a full roll of images separated during Ross' cataloguing endeavours. Although extensive digitization could not be completed for this thesis, further work with such techniques could allow for deeper investigation into the work methodologies adopted by the photographer.

By considering the many elements of the Ross collection and studying the production, use, dissemination and preservation of these materials, the expansion of information gained can only assist in deeming the importance of a body of work such as this. Through the many layers in which Ross' images have been viewed, analyzed and interpreted, one can trace each version or reading of the photographic image to its source negative. By comparing the original negative with a later translation of the image, the layers of narratives can be explored, adding components to the history of the collection. It is through this examination of original content and comparison to later reproductions that Ross can be identified as a photographer and editor, and that the editing process can shape an interpretation of a body of work.

Each step of this thesis has aimed to highlight the relevance of the photographic negative as a primary source within a scholarly research field. The negative can reveal defining

information of a collection's beginnings, uses and future. Ross intended to assemble a collection of photographic objects which would be a record of the Jewish people, and the experiences they endured. The negatives he buried in 1944 have survived almost 70 years, and continue to relay the events documented decades earlier. The future of this collection is one coupled with elements of uncertainty, but the importance of this collection is sure. By incorporating the photographic negative as a historical object and research document into the analysis of Henryk Ross' photographs, another chapter can be added to the history of this collection.

APPENDIX

Flammable Cabinet Storage Proposal for the Henryk Ross Collection Re-Housing Initiative

The following documents contain purchasing information for the flammable storage cabinet proposal regarding the re-housing initiative of the Henryk Ross Collection. Based upon nitrate negative storage regulations, as researched and obtained through the Ontario Fire Marshall's Office fire code under the Ontario Fire Protection and Prevention Act, and the National Fire Protection (NFPA) 40: Standard for the Storage and Handling of Cellulose Nitrate Film, flammable storage cabinet options have been determined which meet these strict regulations. Cabinet options from three different manufacturers have been compiled, documenting size and pricing for various options.

The first manufacturer, Herbert Williams Fire Equipment Ltd., is a Canadian company based in Scarborough. The pricing options for this company have been acquired directly from the head office sales department, rather than a third party distributor. Purchases from Herbert Williams will be delivered by the company, with a delivery charge of \$60.00 CAD.

The second and third manufacturers are Eagle Manufacturing Company, based in West Virginia, and Justrite Manufacturing, from Illinois. Cabinets from both of these companies can be purchased through two distributors. The first, Acklands Grainger, has locations across the Greater Toronto Area, while the second, Cole Palmer, is an American company with Canadian distribution from Montreal. Comparison pricing for both types of cabinets have been provided from both distribution companies. All cost figures are accurate as of May 4, 2010.

This proposal contains technical information from each of the manufacturing companies regarding the details of their products. Following this documentation, a spreadsheet containing comparison pricing in Canadian dollars has been compiled for each of the three manufacturers. These prices do not include tax or shipping costs.



ONTARIO REGULATION 213/07

made under the

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FIRE CODE

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**DIVISION A
COMPLIANCE, OBJECTIVES AND FUNCTIONAL STATEMENTS**

**PART 1
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Subsection 5.14.3.	Roll-Coating Processes
Subsection 5.14.4.	Electrostatic Spraying and Detearing Equipment
Subsection 5.14.5.	Automobile Undercoating
Subsection 5.14.6.	Dry Powder Finishing
Subsection 5.14.7.	Organic Peroxides and Dual Component Coatings
Subsection 5.14.8.	Floor Finishing
SECTION 5.15	RADIOACTIVE MATERIALS
Subsection 5.15.1.	Application
Subsection 5.15.2.	Storage
Subsection 5.15.3.	Emergency Procedures

Source: Ministry of Community Safety and Correctional Services, Office of the Fire Marshal, *Fire Code (2007 Edition)*, Ontario Regulation 213/07, May 25, 2007,

http://www.e-laws.gov.on.ca/html/source/regs/english/2007/elaws_src_regs_r07213_e.htm.

Storage restrictions

5.3.1.5. Matches shall not be stored within 3 m of any elevator shaft opening, stairway or other vertical opening.

SECTION 5.4 CELLULOSE NITRATE PLASTICS

Subsection 5.4.1. Displays

Advertising displays

5.4.1.1. Displays of cellulose nitrate plastic articles in stores that are not in showcases or show windows shall be displayed only when placed on tables or counters not more than 1 m wide and 3 m long, and the spaces underneath the tables or counters shall be kept free of combustible materials.

Lighting fixtures

5.4.1.2. Lighting fixtures shall not be located adjacent to any cellulose nitrate plastic material so as to create a possible ignition hazard.

Subsection 5.4.2. Manufacture

Storage of raw materials

5.4.2.1. Raw materials used in the manufacture of cellulose nitrate plastics shall be stored only in areas reserved for that purpose.

Storage in cabinets

5.4.2.2. Not more than 450 kg of raw material used for the manufacture of finished cellulose nitrate plastic goods shall be stored in cabinets in any one workroom, not more than 225 kg stored in any one cabinet and not more than 112 kg in any one compartment of the cabinet.

Storage in vented vaults

5.4.2.3. Raw material in excess of that permitted in Article 5.4.2.2. shall be kept in vented vaults not exceeding 40 m³ capacity and protected with an automatic sprinkler system installed in conformance with NFPA 13, “Standard for the Installation of Sprinkler Systems”.

Accumulation of materials in workrooms

5.4.2.4. In factories manufacturing articles of cellulose nitrate plastics, **sprinklered** and vented cabinets, vaults or storage rooms shall be provided to prevent the accumulation of excessive quantities of such material in workrooms.

Stationing of operators

5.4.2.5. In the workrooms of factories where cellulose nitrate plastics are being processed, operators shall be stationed not closer than 1 m apart.

Storage in work areas

5.4.2.6. Material for the manufacture of cellulose nitrate plastic articles that is not kept in containers may be placed on tables, workbenches or at machines provided the quantity does not exceed one day's supply.

Storage limitations in workrooms

5.4.2.7. The total amount of cellulose nitrate plastic materials, including the material in containers and on tables, in any one workroom shall not exceed 70 kg.

Waste material storage

5.4.2.8. Waste cellulose nitrate plastic materials such as shavings, chips, turnings, sawdust edgings and trimmings shall be kept under water in metal receptacles until removed from the premises.

Subsection 5.4.3. Storage of Finished Products

Ventilation

5.4.3.1. Areas where cellulose nitrate plastic finished products are stored shall be ventilated so that any decomposition gases produced by the plastics will be vented outdoors to an area where they will not re-enter the **building**.

Heating appliance restrictions

5.4.3.2. (1) Cellulose nitrate plastics shall not be stored

- (a) in rooms containing fuel-burning **appliances** or electrical heating elements, or
- (b) within 600 mm of any steam pipe, radiator or **chimney**.

Storage vaults

5.4.3.3. (1) Where cellulose nitrate plastics in excess of 11 kg are stored in any **fire compartment** in a **building**, a vented cabinet or vault constructed in conformance with NFPA 40E, "Code for the Storage of Pyroxylin Plastic", and Articles 5.4.3.4. and 5.4.3.5. shall be provided for its storage.

(2) Not more than 9000 kg of cellulose nitrate plastics shall be stored in any vault.

Storage up to 3400 kg

5.4.3.4. (1) Where quantities do not exceed 3400 kg, cellulose nitrate plastics shall be stored in a vault that

- (a) has a **fire-resistance rating** of 1.5 h,
- (b) is designed to resist an internal pressure of 3.5 kPa,
- (c) is not greater than 40 m³ in volume,
- (d) has explosion venting of 0.1 m² of venting area to the exterior for every cubic metre of vault volume, and

- (e) is ventilated to the exterior to provide 200 cm² of ventilating area for each cubic metre of vault volume.

Storage in excess of 3400 kg

5.4.3.5. (1) Where quantities exceed 3400 kg but do not exceed 9000 kg, cellulose nitrate plastics shall be stored in a vault that

- (a) has a 4 h **fire-resistance rating**,
- (b) is designed to resist an internal pressure of 28 kPa,
- (c) has explosion venting of 650 cm² of venting area to the exterior for every cubic metre of vault volume, and
- (d) is ventilated to the exterior to provide 200 cm² of ventilating area for each cubic metre of vault volume.

Subsection 5.4.4. Cellulose Nitrate Motion Picture Film

Restricted use

5.4.4.1. Cellulose nitrate motion picture film shall not be used, stored or handled in a place of public assembly.

Storage and handling

5.4.4.2. Cellulose nitrate motion picture film shall be stored and handled in conformance with NFPA 40, “Standard for the Storage and Handling of Cellulose Nitrate Motion Picture Film”.

Storage when not in use

5.4.4.3. When not in use, cellulose nitrate motion picture film shall be kept in closed, single-roll containers.

Subsection 5.4.5. Fire Protection

Sprinkler systems

5.4.5.1. The manufacture and storage of articles of cellulose nitrate plastic in quantities exceeding 45 kg shall be only in **buildings** equipped with a system of automatic sprinklers installed in conformance with NFPA 13, “Standard for the Installation of Sprinkler Systems”.

SECTION 5.5 RESERVED

SECTION 5.6 COMPRESSED GAS CYLINDERS

Subsection 5.6.1. General

Alternative protection measures

5.6.1.1. (1) A requirement of this Section is deemed to be complied with if alternative

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Report of the Committee on Hazardous Chemicals

John A. Davenport, *Chair*
West Hartford, CT [I]
Rep. Industrial Risk Insurers

Anthony Andrews, Witco Corporation, TX [M]
Rep. Society of the Plastics Industry Inc.
James E. Benge, Hercules Inc., DE [U]
William J. Bradford, Brookfield, CT [SE]
Henry L. Febo, Jr., FM Global, MA [I]
Richard Ferguson, PPG Industries, PA [M]
Charles L. Gibson, Gibson Technology & Engineering
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John M. Hoffmann, Safety Engineering Labs Inc., MI [SE]
Bart Howard, Davenport Fire Department, IA [E]
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(Vote Ltd. to NFPA 434)
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Donald J. Hoffmann, Safety Engineering Laboratories, Inc.,
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(Alt. to J. M. Hoffmann)
Thomas M. Lachocki, BioLab, Inc., GA [M]
(Alt. to D. F. Purdy)

Nonvoting

Charles H. Ke, U.S. Dept. of Transportation, DC

Staff Liaison: **Carl H. Rivkin**

Committee Scope: This Committee shall have primary responsibility for documents on, and maintain current codes for, classes of hazardous chemicals and codes for specific chemicals where these are warranted by virtue of widespread distribution or special hazards.

This list represents the membership at the time the Committee was balloted on the text of this edition. Since that time, changes in the membership may have occurred. A key to classifications is found at the front of this book.

This portion of the Technical Committee Report of the Committee on **Hazardous Chemicals** is presented for adoption.

This Report on Comments was prepared by the **Technical Committee on Hazardous Chemicals**, and documents its action on the comments received on its Report on Proposals on NFPA 40, **Standard for the Storage and Handling of Cellulose Nitrate Motion Picture Film**, 1997 edition, as published in the Report on Proposals for the 2001 May Meeting.

This Report on Comments has been submitted to letter ballot of the **Technical Committee on Hazardous Chemicals**, which consists of 19 voting members. The results of the balloting, after circulation of any negative votes, can be found in the report.

(Log #1)

40-1 - (Entire Document): Accept in Principle

SUBMITTER: Richard D. Thompson, Thompson Associates
COMMENT ON PROPOSAL NO: 40-2

RECOMMENDATION: Reject this proposal for the following reasons.

SUBSTANTIATION: While the intent of this proposal to include all existing photographic film on a cellulose nitrate base is desirable, the practicality of such a proposal requires further consideration. We recommend that this proposal be tabled until a Task Group can be formed consisting not only of this Technical Committee's members, but archivists specializing in the preservation of photographic image collections. Consideration should also be given to shift this proposed requirement to NFPA 232, Protection of Records and NFPA 232A, Fire Protection for Archives and Record Centers.

A cursory investigation of several collections already have their materials in existing nitrate film vault. However, this casual study does not provide a full understanding of the order of magnitude of material existing in both public and private collections if moved to nitrate film vaults. We must consider not only museum and library collections, but newspapers, magazines, advertising agencies, manufacturer's archives, and private collections.

The present design of vaults in NFPA 40 were developed over many years specifically to contain 35 mm motion picture films. While the basic vault design may be adequate, the requirements for the storage of flat film or non-motion picture photographic materials to be properly stored and archived, requires a different interior design. It will be necessary for the CMP to design and develop a storage system suitable for flat film storage and incorporate it into this code as detailed as that which now exists for 35 mm motion picture film.

For the committee's information, we have researched the dates of discontinuance of the various forms of cellulose nitrate base film stock. This information was provided to us by Dr. Rod Ryan and by Eastman Kodak's Technical Information Center.

X-Ray Film	1933
135 mm Roll Film	1938
Portrait Sheet Film	1939
Aerial Film	1942
Film Packs	1949
Roll Film	1950
35 mm Motion Picture Film	1951

COMMITTEE ACTION: Accept in Principle.

Chapter 4 Storage of Nitrate Film

4-1 General. Nitrate motion picture film, which is not in process or being worked on, shall be stored as follows:

(a) Amounts exceeding 25 lb [11 kg (5 standard rolls)] but not exceeding 750 lb [340 kg (150 standard rolls)], shall be stored in approved cabinets or in vaults. (See Sections 4-2 and 4-3.)

(b) Amounts exceeding 750 lb [340 kg (150 standard rolls)] shall be stored in vaults. (See Section 4-3.)

(c) Extended term storage film shall be stored in extended term storage cabinets or extended term storage vaults, which are subject to the limitations of Sections 4-1(a) and (b). (See Sections 4-4 and 4-5.)

4-2 Film Cabinets.

Existing Figure 4-2 (97 ed) (no change)

Figure 4-2 Standard film cabinet (for other than extended term storage film).

4-2.1 Film cabinets shall be constructed in the following manner:

(a) The bottom, top, door, and sides of the cabinet shall be at least No. 18 U.S. gauge sheet steel and double walled with 1 1/2-in. (38-mm) air space.

(b) Joints shall be riveted, welded, or made tight by some equally effective means.

(c) The door shall be provided with a three-point latch arrangement, and the door sill shall be raised at least 2 in. (5 cm) above the bottom of the cabinet to retain spilled liquid within the cabinet as shown in Figure 4-2.

4-2.2 Cabinets shall have a capacity not exceeding 375 lb [170 kg (75 standard rolls)].

4-2.3 Shelves shall be made of noncombustible, insulating material not less than 3/8 in. (9.5 mm) thick or of hardwood that is not less than 1 in. (2.5 cm) thick.

4-2.3.1 Shelves shall fit tightly to the back and sides of the cabinet. There shall be a clearance of at least 1 in. (2.5 cm) between the front of the shelf and the inside of the door.

4-2.3.2 Shelves for motion picture film storage shall be 1 in. (2.5 cm) wider, with a tolerance of 1/4 in. (6.4 mm), than the diameter of the largest roll that is stored in the cabinet. Stops or

bars shall be provided so that film cans cannot be stored with the front edge less than 3/4 in. (19 mm) from the front edge of the shelf. There shall be no thumbholes or indentations in the shelves that will allow any part of the containers to project forward from the front edge of the shelf.

4-2.4* Each cabinet having a capacity of more than 50 lb [23 kg (10 standard rolls)] of nitrate film shall be provided with a vent to the outside of the building. The vent shall have a minimum effective cross-sectional area of 14 in.2 per 100 lb (90 cm 2 per 45 kg) of film capacity.

4-2.4.1 Vent flues shall be of a construction that is equivalent to No. 18 U.S. gauge riveted sheet steel and, where inside the building, it shall be covered with 1 in. (2.5 cm) of noncombustible, thermal-insulating material.

4-2.5 Cabinet Protection.

4-2.5.1 Cabinets having a capacity of more than 75 lb [34 kg (15 standard rolls) (appendix material)] of film shall be provided with at least one automatic sprinkler head.

4-2.5.2 Where film is stored on more than one shelf, as shown in Figure 4-2 and as described in 4-2.6.1 or 4-2.6.2, one sprinkler head shall be provided for each shelf.

4-2.6 Film in cabinets shall be in individual roll containers or in U.S. Department of Transportation (DOT) shipping containers. Materials other than film shall not be stored in the same cabinet with nitrate film. Where cabinets are provided with individual, insulated compartments for each roll, the individual rolls shall not be required to be in cans or other containers. Sections 4.2.6, 4.2.6.1, 4.2.6.2 apply only to motion picture film.

4-2.6.1 Film cans, if placed on edge, shall be limited to not more than 25 cans per shelf.

4-2.6.2 Film cans, if placed flat, shall be stacked no more than five cans high with not more than three stacks per shelf.

4-3 Vaults Other than Extended Term Storage Vaults. (See Figure 4-3.)

4-3.1 Vaults shall be constructed in accordance with plans that have been submitted to and approved by the authority having jurisdiction.

4-3.1.1 Vaults shall not exceed 750 ft3 (21 m3) in inside volume. Where the height of the vault ceiling results in a vault having a volume greater than 750 ft3 (21 m3), a heavy wire screen of at least 2-in. (5-cm) mesh or equivalent shall be installed below the ceiling to limit the interior vault space to 750 ft3(21 m3). (See Figure 4-3.)

4-3.1.2* Walls and floors of vaults shall be of Type I construction and shall have not less than 4-hr fire resistance. Where masonry units have cracks or holes, the surface shall be plastered on both sides with a cement plaster to a minimum thickness of 1/2in. (13 mm) to prevent escape of gases through wall cracks.

4-3.1.3 Where the ceiling of a vault is a bearing floor, it shall have a fire resistance of at least four hours.

4-3.1.4 Where the vault walls extend 3 ft (0.9 m) or more above the roof, the vault roof and ceiling shall be permitted to be constructed of noncombustible materials and shall be permitted to serve as an explosion vent.

Existing Figure 4-3 (97 ed) (no change)

Figure 4-3 Standard film vault (for other than extended term storage film).

4-3.1.5 Vaults shall be provided with drains or scuppers to carry automatic sprinkler discharge directly to the outside of the building.

Exception: Existing vaults shall not be required to drain directly to the outside.

4-3.2* Door openings shall be protected with automatic, self-closing fire door assemblies having a fire protection rating of three hours. Such doors shall be installed in accordance with NFPA 80, Standard for Fire Doors and Fire Windows, and, if held open, shall be arranged to close automatically upon actuation of an approved smoke detector that is located in the vault.

Exception: Existing heavy steel doors or combinations of one swinging and one sliding door, both of steel construction, shall be permitted to be accepted at the discretion of the authority having jurisdiction.

4-3.3 Vaults shall have temperature controlled to maintain temperature at 70 f or less.

(appendix: The life of nitrate film retained for its historical value will be maximized when it is stored in individually air-conditioned and sprinklered extended term storage vaults. Often these vaults are maintained at temperatures as low as 35 F and a relative humidity of 30 %. Air changes to minimize decomposition product accumulation can also be effective).

4-3.3* Each vault shall be provided with an independent decomposition vent having a minimum effective cross-sectional area of 200 in.2 per 1000 lb [1300 cm2 per 454 kg] (200 standard rolls) of film capacity.
 Exception: In vaults that are provided with explosion venting, the decomposition vent shall be permitted to be omitted.
 4-3.3.1 Existing vaults shall be provided with independent vents having an effective minimum cross-sectional area of at least 140 in.2 per 1000 lb [903 cm2 per 454 kg] (200 standard rolls) of film capacity.
 4-3.3.2 The vent area for a standard 750-ft3 (21-m3) vault of new construction shall be not less than 2000 in.2 (130 m2). (See Figure 4-3.3.2.)

**Existing Figure 4-3.3.2 (97 ed) (no change)
 Figure 4-3.3.2 Decomposition vent.**

4-3.3.3* Vent flues within the building shall be of Type I construction having a fire resistance of four hours.
 4-3.3.4 The outlet of each vent shall be above the roof and, where vents discharge horizontally, a deflector wall or other device shall be provided to deflect gases upward. Vents shall be located at least 50 ft (15 m) horizontally from any window or other opening exposed thereby and at least 25 ft (7.6 m) from any fire escape on the same or a higher level.
 4-3.3.5* Vaults, especially those having a window for a vent, shall be arranged so that the nitrate film in the vault is protected against ignition by the following:
 (a) Rays of the sun, wherever the film in the vault is exposed to direct sunlight entering through the vent
 (b) Radiated heat entering through the vent opening, as from an exposure fire, wherever the vent is severely exposed by buildings or storage of combustible material or by other openings in the same wall
 4-3.3.6* Each vent shall be protected against the weather by either single-thickness [1/6-in. (4.2-mm)] glass in a sash arranged to open automatically in case of fire or a hinged hollow metal or insulated vent panel. Either of the above shall be equipped with an approved, releasing device, which is placed inside the vault. The vents shall be arranged to open by both temperature or internal pressure of 5 lb/ft2 (2.3 kg/m2). No pane of glass shall be smaller than 200 in.2 (1300 cm2).
 4-3.3.7 A light wire screen that is not coarser than 1/8-in. (3.2-mm) mesh shall be permitted to be placed in each vent. No bars or screens other than this insect screen shall be placed in vent openings.
 4-3.4* Where there is a possibility of fire being transmitted from one vault to another or to another building through open skylights, glass windows, light roof panels, or venting devices, provisions shall be made to prevent this possibility.
 4-3.5 Racks in new film vaults shall be of hardwood or of noncombustible insulating material and shall consist of shelves tightly fitted to walls and vertical baffles. Sections 4.3.5 through 4.3.5.4 apply only to motion picture film.
 4-3.5.1 Vertical barriers shall be of noncombustible insulating material that is at least 3/8 in. (9.5 mm) thick. They shall be spaced to divide the racks into sections of not more than 3 ft (0.9 m) in width.
 4-3.5.2 Shelves shall be at least 1 in. (2.5 cm) wider than the diameter of the largest stored container.
 4-3.5.3 Metal supports shall be permitted to be used to keep containers in place.
 4-3.5.4 Open racks in new construction shall be used only for storage of film in standard DOT containers or in insulated boxes.
 4-3.6 In new vaults, fire protection shall be provided by a wet pipe automatic sprinkler system or, where speed of operation is important, a deluge system.
 4-3.6.1 Sprinkler protection utilizing regular automatic sprinklers or open sprinklers shall be calculated on the basis of one sprinkler for each 62.5 ft3 (1.8 m3) of the interior vault volume.
 4-3.6.2 The minimum number of sprinklers for a standard 750-ft3 (21-m3) vault shall be not less than 12.
 4-3.6.3* Sprinklers or nozzles shall be arranged to provide coverage over the tops and fronts of shelves.
 4-3.6.4 Where automatic sprinklers are used, barriers made of No. 24 U.S. gauge sheet steel or other acceptable noncombustible material shall be installed between each sprinkler. Barriers shall be fastened rigidly in place and shall extend from the ceiling down to 4 in. (10 cm) below the sprinkler deflectors.
 4-3.6.5 The authority having jurisdiction shall be consulted for water and arrangement requirements for either automatic sprinklers or fixed spray nozzles.

4-3.7 Light fixtures shall comply with the requirements of 2-6.1. All switches shall be outside the vault, and provided with pilot lights to indicate whether vault lights are on or off.
 4-3.8 Where heat is required to prevent freezing of the sprinkler system, it shall be provided by hot water or low-pressure steam that is limited to 10 psig (gauge pressure of 69 kPa) maximum pressure. Vault temperature shall not exceed 70°F (21°C) (see 4.3.3). Radiators shall be placed at the ceiling, over aisle spaces, and with pipes. Also, radiators shall be protected by wire guards that are arranged so that film cannot be placed within 12 in. (30 cm) of them.
 4-3.9 All motion picture film that is stored in vaults shall be in single- or double-roll containers or in DOT-approved shipping containers.
 4.4 Extended Term Storage Cabinets.
 4-4.1 Extended term storage cabinets shall be provided with individual drawers or compartments, each holding not more than 2000 ft (610 m) of film. Individual compartments shall be separated by 3/8 in. (9.5 mm) of noncombustible, insulating material. Each compartment shall be provided with a hinged damper of similar device to allow release or decomposition gases into the cabinet vent.
 4-4.2 Extended term storage cabinets shall be provided with automatic sprinklers when holding more than 50 lb (23 kg) of nitrate film.
 4-4.3* Each extended term storage cabinet having a capacity of more than 50 lb [23 kg (10 standard rolls)] of film shall be provided with a vent to the outside of the building. The vent shall have a minimum cross-sectional area of 14 in.2 per 100 lb [90 cm2 per 45 kg] (200 standard rolls of film capacity).
 4-4.3.1 Decomposition vent pipes shall be of No. 18 U.S. gauge riveted steel or equivalent. Where located within the building, decomposition vent pipes shall be covered with 1 in. (2.5 cm) of noncombustible insulating material.
 4-5 Extended Term Storage Vaults.
 (See Figure 4-5.)
 4-5. Extended term storage vaults shall not exceed 1000 ft³ (28 m³) in interior volume. Where the height of the vault ceiling results in a vault having an interior volume greater than 1000 ft³ (28 m³) or greater than the volume that is agreed upon by the authority having jurisdiction, then the interior vault space shall be permitted to be limited as described in 4-3.1.1. (See Figure 4-5.)
 4-5.1.1 Walls and floors shall be of Type I construction, having a fire resistance of four hours. Where masonry units have cracks or holes, the surface shall be plastered on both sides with a cement plaster to a thickness of at least 1/2 in. (13 mm). Equivalent construction that will provide equal fire resistance and prevent escape of gases through wall cracks shall be permitted to be used.
 4-5.1.2 Extended term storage vaults shall comply with 4-3.1.3, 4-3.1.4, and 4-3.1.5.
 4-5.2 Door openings in extended term storage vaults shall be protected in accordance with the requirements of 4-3.3, except as modified by 4-3.4 and 4-3.5.
 4.5.3 Maximum temperature control shall be provided in accordance with 4.3.3.
 4-5.3 Extended term storage vaults shall be provided with decomposition vents meeting the requirements of 4-3.3, except as modified by 4-3.4 and 4-3.5.
 Exception: In vaults provided with explosion venting, the decomposition vent shall be permitted to be omitted.
 4-5.3.1 The vent area for a standard 1000-ft³ (28-m³) extended term storage vault shall be not less than 2670 in.2 (1.72 m²). (See Figure 4-3.3.2.)
**Existing Figure 4-5 (97 ed) (no change)
 Figure 4-5 Extended term storage vault.**
 4-5.4 Extended term storage vaults shall be provided with horizontal shelves and vertical barriers that are spaced so that not more than two containers, each containing 1000 ft (305 m) of film, shall be permitted to be placed in each compartment. Sections 4.5.4 through 4.5.4.4 apply only to motion picture film.
 4-5.4.1 The spacing between shelves shall be such that the container covers can be lifted approximately 1/2 in. (13 mm) but cannot be lifted completely off the container.
 4-5.4.2 The shelves shall be separated by vertical barriers so that not more than one container can be placed between vertical barriers. The vertical barriers and the shelves shall be of noncombustible insulating material that is at least 3/8 in. (9.5 mm) thick or of hardwood construction that is at least 1 in. (2.5 cm) thick.
 4-5.4.3 Containers shall be placed on shelves in contact with the back wall.

4-5.4.4 Racks shall be designed in relation to the sprinkler system so that the open face of each rack structure shall be protected by the sprinkler system.

4-5.5 In new extended term storage vaults, fire protection shall be provided in accordance with 4-3.6.

Exception: As modified in 4-5.5.1 through 4-5.5.3.

4-5.5.1 Sprinklers shall be provided in a ratio of one head for each 62.5 ft³ (1.8 m³) of vault volume.

Exception: Sprinkler systems in existing extended term storage vaults that were in compliance with the provisions of this standard at the time of installation shall be permitted to be continued in use.

4-5.5.2 The minimum number of sprinkler heads for a 1000-ft³ (28-m³) vault shall be 15 (16) sprinklers.

Exception: Sprinkler systems in existing extended term storage vaults that were in compliance with the provisions of this standard at the time of installation shall be permitted to be continued in use.

4-5.5.3 Directional sprinkler heads that will provide coverage into the face of the shelves shall be provided.

4-5.6 Interior lighting for extended term storage vaults shall comply with 4-3.7.

4-5.7 Where heat is required to prevent freezing of the sprinkler system, the heating system shall comply with 4-3.8.

4-5.8 All film that is stored in extended term storage vaults shall be in single- or double-roll containers or in DOT-approved shipping containers. The cover of the container that is used shall not lift off when the container is placed properly in the rack.

COMMITTEE STATEMENT: The Committee has sufficient information to expand the document to include cellulose nitrate flat film. The committee modified portions of Chapter 4 of the document to reflect the inclusion of flat film storage. The Committee will create a task group to further refine the storage requirements for flat film for the next edition of NFPA 40.

NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE: 19

VOTE ON COMMITTEE ACTION:

AFFIRMATIVE: 13

ABSTENTION: 1

NOT RETURNED: 5 Ferguson, Gibson, Norsworthy, Purdy, and Rambo

COMMENT ON AFFIRMATIVE:

FEBO: These are duplicate paragraph numbers 4-3.3 and 4-5.3. These need to be revised and subsequent paragraphs renumbered.

EXPLANATION OF ABSTENTION:

BRADFORD: I am abstaining on all items. I did not understand the corrections as received in the ballot package.

(Log #3)

40-2 - (Entire Document): Reject

SUBMITTER: Terresa McIntosh, National Archives of Canada

COMMENT ON PROPOSAL NO: 40-2, 40-3, 40-5

RECOMMENDATION: Reject these proposals for the following reasons.

SUBSTANTIATION: Several factors need to be considered prior to rejecting or accepting this recommendation to have the wording of the standard changed throughout from: "cellulose nitrate motion picture film" to "all film stock on cellulose nitrate base". NFPA 40 exists to address fire and safety issues inherent in the storage and handling of nitrate based motion picture film and includes requirements for the building itself, shelving within the vaults, housing/enclosures for the material itself and projection. It is intended to limit damage and loss in the event of both spontaneous combustion of cellulose nitrate and fires initiated outside the collection. Currently it does not include the storage of still photograph sheet film nor does it (nor was it ever intended to) address the issue of long term preservation. It, in fact, does not meet long term preservation needs of nitrate film.

In order to address both safety and preservation, collection managers must consider the recommendations of both NFPA 40 and preservation authorities. Although by no means mutually exclusive, it does raise some issues requiring clarity, with regards to the changes currently being proposed for NFPA 40 and the appropriateness of including sheet film in this standard.

Factors To Be Considered:

1. The current standard includes housing requirements for motion picture film only. In most large collecting institutions, sheet film is generally stored in individual paper sleeves in archival cardboard storage boxes with ventilation. This is seen as the most appropriate housing method in that volatile chemicals emitted by the film base would be absorbed by the paper sleeve and the build up of large concentrations would not be allowed to happen due to the venting of the box. The concentration of material inside the box is considerably less than found in film cans and the paper sleeves have been seen to limit the combustibility of the film (1992

Swedish burn test on cellulose nitrate sheet film). By not addressing the enclosure issue in this current recommendation for change to the standard, collections would be required to store sheet film in a potentially inappropriate manner, potentially leading to more rapid deterioration. Given the density of storage within a motion picture film canister versus a much less dense storage of sheet film in envelopes and boxes, there is a much better chance of longevity for the latter. Having said that, there are examples of nitrate sheet film deteriorating very rapidly and destroying other records in proximity.

2. The stability of nitrate based film including both motion picture and sheet film was the subject of a study at the Image Permanence Institute in the mid-90's. The study identifies two basic facts concerning all types of nitrate; it has potentially greater stability than what has traditionally been thought, and low temperature/low humidity storage is seen to dramatically increase the life span of all nitrate. The manufacture of nitrate has never been an exact science and as a result there is a full spectrum of stabilities within this historical medium. Some films have been seen to deteriorate in a matter of a couple of years while others last in essentially pristine condition for 50 years and more. It is impossible to know the history of all nitrate in a collection and trying to predict its lifespan is extremely difficult.

3. A potentially more damaging negative impact on collections should NFPA 40 be expanded to include all nitrate based film, is that most small collecting institutions whether they be archives, museums or libraries, will never be able to achieve the building standards and environments outlined in NFPA 40 due to associated costs. The decision not to comply with an expanded NFPA 40 may cause institutions to destroy the offending material countering most collection mandates, that include preservation.

4. Concern over the potential hazards of nitrate records has caused many institutions to simply copy and destroy. Although duplication of collections may maintain a good portion of the original information it can never be seen as a substitute. Following the 1978 fire in the National Archives and Records Administration nitrate storage vault in Suitland, Maryland, the remaining nitrate motion picture and sheet film in the collection was duplicated on direct duplicating film and all originals discarded. The National Geographic Society did the same. Unfortunately, the end result has been they are now left with only very poor copies of much historic material.

Other Options for Sheet Film:

For institutions collecting nitrate material whether sheet film or motion picture the storage of nitrate based material must be viewed with preservation in mind.

1. Often, cold storage exists within institutions or is available to them, and should this not conform to NFPA 40, theoretically the material would have to be removed. Furthermore, low cost, frost-free refrigerator options do exist which would offer considerable protection, both for the facility and for the film. Refrigerators are extremely well insulated and offer considerable fire protection for contents.

2. Segregating the nitrate and clearly identifying it ahead of time for fire departments during inspections could result in strategies that would significantly reduce risk. Problems associated with storing deteriorating nitrate sheet film with acetate film have been recorded and studied, but no fires are known of.

3. Following more research and a thorough investigation of the 1992 Swedish test, if deemed necessary, a separate standard could be written to address the unique problems of sheet film.

Summary:

There is no doubt that cellulose nitrate motion picture film is hazardous and has caused considerable damage in the past. This has been addressed very thoroughly under NFPA 40. Sheet film on the other hand is rarely stored in the same degree of density as found with motion picture film and is not known to have been the source of a spontaneous combustion fire. A closer look at the Swedish Test on the burning of sheet film and considerable more research should be done in order to determine if in fact, the material poses any real risk requiring inclusion in NFPA 40.

COMMITTEE ACTION: Reject.

COMMITTEE STATEMENT: The Committee has sufficient information to expand the document to include cellulose nitrate flat film. The Committee will create a task group to further refine the storage requirements for flat film for the next edition of NFPA 40.

NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE: 19

VOTE ON COMMITTEE ACTION:

AFFIRMATIVE: 13

ABSTENTION: 1

NOT RETURNED: 5 Ferguson, Gibson, Norsworthy, Purdy, and Rambo

EXPLANATION OF ABSTENTION:

BRADFORD: See my Explanation of Abstention on Comment 40-1 (Log #1).

(Log #CC4)

40- 3 - (1-6): Accept

SUBMITTER: Technical Committee on Hazardous Chemicals
COMMENT ON PROPOSAL NO: 40-2

RECOMMENDATION: Revise text to read as follows:
Extended term storage vault. A specially constructed and equipped storage area room with both a 4-hr fire rating and an inside volume that does not exceed 1000 100 ft³ (28m³).

SUBSTANTIATION: This action corrects a typographical error.

COMMITTEE ACTION: Accept.

NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE: 19
VOTE ON COMMITTEE ACTION:

AFFIRMATIVE: 13

ABSTENTION: 1

NOT RETURNED: 5 Ferguson, Gibson, Norsworthy, Purdy, and Rambo

EXPLANATION OF ABSTENTION:

BRADFORD: See my Explanation of Abstention on Comment 40-1 (Log #1).

(Log #CC2)

40- 4 - (2-8.2): Accept

SUBMITTER: Technical Committee on Hazardous Chemicals
COMMENT ON PROPOSAL NO: 40-2

RECOMMENDATION: Revise text to read as follows:
Any duct system used for air that is conditioning a fil vault or room where nitrate film is handled shall be entirely independent with no duct connecting to any other vault unless backdraft dampers and fire dampers capable of withstanding 1 psig overpressure are used.

SUBSTANTIATION: This requirement would reduce the probability of a fire from traveling from one vault to another and is needed with the expanded scope of the document.

COMMITTEE ACTION: Accept.

NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE: 19
VOTE ON COMMITTEE ACTION:

AFFIRMATIVE: 13

ABSTENTION: 1

NOT RETURNED: 5 Ferguson, Gibson, Norsworthy, Purdy, and Rambo

EXPLANATION OF ABSTENTION:

BRADFORD: See my Explanation of Abstention on Comment 40-1 (Log #1).

(Log #CC3)

40- 5 - (2-8.3): Accept

SUBMITTER: Technical Committee on Hazardous Chemicals
COMMENT ON PROPOSAL NO: 40-2

RECOMMENDATION: Add text to read as follows:
2.8.3 Air shall not be recirculated between vaults.

SUBSTANTIATION: This requirement would reduce the probability of a fire from traveling from one vault to another and is needed with the expanded scope of the document.

COMMITTEE ACTION: Accept.

NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE: 19
VOTE ON COMMITTEE ACTION:

AFFIRMATIVE: 13

ABSTENTION: 1

NOT RETURNED: 5 Ferguson, Gibson, Norsworthy, Purdy, and Rambo

EXPLANATION OF ABSTENTION:

BRADFORD: See my Explanation of Abstention on Comment 40-1 (Log #1).

(Log #2)

40- 6 - (6-1.1): Accept

SUBMITTER: Richard D. Thompson, Thompson Associates
COMMENT ON PROPOSAL NO: 40-10, 40-11

RECOMMENDATION: Reverse the committee's decision to reject these similar proposals, and accept them based on the following additional information.

SUBSTANTIATION: The committee's two objections to the proposal and to a similar proposal 40-11 were rejected on the concern that the projection booth must be sprinklered, and a determination as to the amount of nitrate film within the projection booth at any one time.

The requirement for sprinklering of nitrate motion picture booths is covered in the Uniform Building Code, Section 3802(b)4, states, "In rooms where nitrate film is stored or handled." Since this is a

building code requirement, the authorities having jurisdiction in approving the construction of these new facilities would be required to comply with this provision. While we have cited only the UBC, such requirements exist in all other building codes in the United States

As to the amount of film that would be exposed or open at any one time, we must consider the operating methods for these booths. To begin, the film reels that will be used in the archival review process can be stored in an approved storage cabinet similar to that illustrated in this standard as Figure 4-2, or in DOT containers. Individual reels of film are in common practice placed, within the approved nitrate film projector's supply reel magazine and removed from the take up reel magazine, or are being rewound in an approved nitrate rewind machine. In addition, the rewind bench contains approved containers to hold individual reels of film.

The only reel of film that is "open" is the one being transferred from storage to a projector or from the projector to the rewind or from the rewind to storage. We can expect in common practice that there would be only 1 to perhaps 3 reels in a "transit stage" at any one time.

Note: Supporting material is available upon request at NFPA Headquarters.

COMMITTEE ACTION: Accept.

The text will be that of Proposal 40-10.

NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE: 19
VOTE ON COMMITTEE ACTION:

AFFIRMATIVE: 12

NEGATIVE: 1

ABSTENTION: 1

NOT RETURNED: 5 Ferguson, Gibson, Norsworthy, Purdy, and Rambo

EXPLANATION OF NEGATIVE:

FEBO: As worded we appear to be accepting Proposals 40-10 and 40-11, each of which have slightly different wording. I can't tell what wording we have really accepted.

EXPLANATION OF ABSTENTION:

BRADFORD: See my Explanation of Abstention on Comment 40-1 (Log #1).

(Log #CC1)

40- 7 - (6-1.2): Accept

SUBMITTER: Technical Committee on Hazardous Chemicals
COMMENT ON PROPOSAL NO: 40-10

RECOMMENDATION: Add text to read as follows:

6.1.2 No more than 75 lb. of nitrate film shall be allowed in the projection booth unless stored in an approved cabinet in accordance with Chapter 4.

SUBSTANTIATION: This requirement would would exclude extra nitrate film from the projection booth to keep the amount of material in the booth to the minimum required for single film projection.

COMMITTEE ACTION: Accept.

NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE: 19
VOTE ON COMMITTEE ACTION:

AFFIRMATIVE: 13

ABSTENTION: 1

NOT RETURNED: 5 Ferguson, Gibson, Norsworthy, Purdy, and Rambo

EXPLANATION OF ABSTENTION:

BRADFORD: See my Explanation of Abstention on Comment 40-1 (Log #1).

(Log #CC5)

40- 8 - (Table B-1): Accept

SUBMITTER: Technical Committee on Hazardous Chemicals
COMMENT ON PROPOSAL NO: 40-2

RECOMMENDATION: Revise text to read as follows:

Gasoline 22,700 84380 52900

SUBSTANTIATION: This action corrects a typographical error.

COMMITTEE ACTION: Accept.

NUMBER OF COMMITTEE MEMBERS ELIGIBLE TO VOTE: 19
VOTE ON COMMITTEE ACTION:

AFFIRMATIVE: 13

ABSTENTION: 1

NOT RETURNED: 5 Ferguson, Gibson, Norsworthy, Purdy, and Rambo

EXPLANATION OF ABSTENTION:

BRADFORD: See my Explanation of Abstention on Comment 40-1 (Log #1).



**NON-INSULATED/
FM APPROVED**

The FM Safety Storage Cabinet will offer safer storing for flammable liquids, reduce time-consuming trips to remote storage rooms and permit storage close to work areas

For maximum safety, fill the cabinet with approved WB Safety Cans

Comply with OSHA regulations

Designed in accordance with the standards of NFPA Code 30

Meet specifications for Factory Mutual Approval

FEATURES

Quality constructed from 18 gauge steel

Double wall welded construction

2" of air space between the inner and outer walls

Door sill raised 2" above the bottom of the cabinet to form a liquid-tight well

Three point lock on door

Adjustable satin coat galvanized shelves permit storing of various size containers

Four adjustable levelling feet

2" threaded vents, one on each side, allow for ventilation

Fire baffle covers each vent

Painted with safety yellow enamel, with red bi-lingual letters, warning: "FLAMMABLE-KEEP FIRE AWAY"

Each cabinet individually cartoned

All cabinets – double door style

Extra shelves available – slight additional charge



MODEL # AF120
Exterior Dimensions
(HxWxD)
(66 x 66 x 35)"

MODEL # FM30
Exterior Dimensions
(HxWxD)
(45 x 44 x 19)"



MODEL # FM45
Exterior Dimensions
(HxWxD)
(66 x 44 x 19)"

MODEL # FM60
Exterior Dimensions
(HxWxD)
(63 x 35 x 35)"



HORIZONTAL DRUM
MODEL # FM45H
Exterior Dimensions
(HxWxD)
(50 x 35 x 50)"

VERTICAL DRUM
MODEL # FM45V
Exterior Dimensions
(HxWxD)
(63 x 35 x 35)"

**DRUM ROLLER KIT
FOR VERTICAL CABINETS**



MODEL # DRK-5



SAFETY STORAGE CABINETS – FM APPROVED

MODEL	TEST LAB APPROVAL	CAPACITY (GAL.)	WIDTH (INCHES)	DEPTH (INCHES)	HEIGHT (INCHES)	WEIGHT (LBS.)	SHELVES NO.
FM30	*FM † +	30	44	19	45	300	1
FM45	*FM † +	45	44	19	66	375	2
FM45H (HORIZONTAL DRUM)	† +	45	35	50	50	450	-
FM45V (VERTICAL DRUM)	† +	45	35	35	63	420	-
FM60	† +	60	35	35	63	430	2
AF-120	† +	120	66	35	66	700 EST.	2

EXTRA SHELVES / ROLLER KIT

WB-5	EXTRA METAL SHELF FOR 30 & 45 GALLON CABINETS
WB-S60	EXTRA METAL SHELF FOR 60 GALLON CABINET
DRK-5	DRUM ROLLER KIT (5 PER PKG) FOR VERTICAL DRUM CABINETS
WBSC	ADDITION PACKAGE OF SELF CLIPS (4) PER PACKAGE

*Complies with OSHA regulations. *FM-Factory Mutual Approved + Made to same specifications as a FM approved cabinet
† All cabinets are designed in accordance with specifications set forth by the National Fire Protection Association

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4 Adjustable Galvanized Leveling Legs

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All Cabinets Have Self Latching Doors

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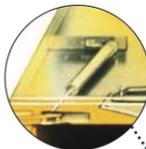
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Safety Cabinets

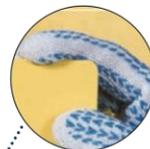
New!

Haz-Alert™ Reflective labeling provides high visibility in the dark under fire conditions or power outage when illuminated by a flashlight beam.

Patent Pending. Hazard warning in three languages.



Patented concealed self-close mechanism provides obstruction-free access to top shelf space. Self-indexing doors guarantee they will close in sequence and assure a tight closure from top to bottom (on self-close models).



Rounded safety corners on doors reduce accidental nicks or cuts and potential hand injury.



Fusible links hold doors wide open and melts at 165°F (74°C) for automatic closure (on self-close models).

Minimal air-gaps provide better protection.

Sturdy, 18-gauge (1mm) double wall steel with 1½" (38mm) of insulating air space.

Easy close, self-latching doors.

Fully-welded (not riveted) construction holds squareness for longer life, offering greater protection in a fire since air gaps are reduced.

Continuous piano hinge provides smooth closure.

Built-in grounding connector (on outside side panel) for easy grounding.

Dual vents with built-in flame arresters strategically placed at bottom and opposite top are welded, not screwed in place.

Durable and chemical resistant, hybrid lead-free powder coat paint finish, inside-and-out, retains high gloss look and minimizes the effects of corrosion and humidity.

Adjustable leveling feet for stability on uneven surfaces.



New!

Exclusive SpillSlope™ safety shelves direct spills to back and bottom of leak proof sump.

Heavy-gauge galvanized steel shelves are bi-directional and easily adjust on 3" (76mm) centers for versatile storage. Meet ANSI standards with a 350lb. (159kg.) safe allowable load. **Patent Pending**



894520, 45 gal., self-close

Welded shelf hangers interlock with shelf to offer maximum "no slip" stability... and no flimsy brackets to lose.

2" (51mm) liquid-tight containment sump with up to a 5-gal. (19L) capacity on 45-gal. (170L) models, holds leaks and meets EPA requirements.



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Stainless steel, three-point bullet self-latching system provides easy, fail-safe, positive door closure with increased heat resistance.



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Exclusive U•Loc™ Padlockable Handle. Optional padlock* allows for extra security and keycoding multiples for convenient access. Flush paddle handle with slip resistant grip offers easy fingertip operation and reduces dangerous "catches" from passing traffic. Double key set included for keyed lock. **Patent Pending**

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Product Data and Price Comparison

All cost figures are accurate as of May 4, 2010.

Product	Size (HxWxD in inches)	Shelves	Herbert Williams Code	Herbert Williams Price
Herbert Williams	44 x 19 x 45	1	HWF30M	\$580.00
	44 x 19 x 66	2	HWF45M	\$705.00
	35 x 35 x 63	2	HWF60M	\$790.00
	Extra Shelf for FM30 & FM45	1	HWS1843	\$55.00
	Extra Shelf for FM60	1	HWF3434	\$65.00

Product	Size (HxWxD in inches)	Shelves	Acklands-Grainger Code	Acklands-Grainger Price (CDN)	Cole Palmer Code	Cole Palmer Price (CDN includes import fees)
Eagle	44x43x18	1	EGL1932	\$1,249.24	R-09418-65	\$1,099.48
	65x43x18	1	EGL1947	\$1,463.95	R-09418-70	\$1,312.85
	65x31½x31¼	2	EGL1962	\$1,834.82	R-09418-92	\$1,479.77
	Extra Shelf (for two smaller cabinets)	1	EGL1915	\$72.36	R-09418-60	\$77.82
	Extra Shelf (for larger cabinet)	1	EGL1911	\$144.81	R-09418-61	\$119.24
Justrite Sure Grip	44 x 43 x 18 2 Door, Manual Close	1	JRT893000	\$917.91	CV-81790-44	\$953.88
	44 x 43 x 18 2 Door, Self-Close	1	JRT893020	\$1,040.61	CV-81790-45	\$935.06
	35 x 36 x 24 2 Door, Manual Close	1	JRT893300	\$1,276.74		
	65 x 43 x 18 2 Door, Manual Close	2	JRT894500	\$1,116.64	CV-81790-41	\$1,154.70
	65 x 43 x 18 2 Door, Self-Close	2	JRT894520	\$1,249.12	CV-81790-36	\$1,236.28
	65 x 34 x 34 2 Door, Manual Close	2	JRT896000	\$1,358.76	CV-81790-42	\$1,368.07
	65 x 34 x 34 2 Door, Self-Close	2	JRT896020	\$1,476.97	CV-81790-37	\$1,443.35
	Extra Shelf for 43" W	1	JRT29937	\$48.52	CV-81790-46	\$45.81
	Extra Shelf for 36" W	1	JRT29942	\$97.04		
Extra Shelf for 34" W	1	JRT29944	\$69.05	CV-81790-48	\$100.41	

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