What Computational Archival Science Can Learn from Art History and Material Culture Studies

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Abstract— **I discuss the significance of considering the material and cultural implications, as practiced in Art History and Material Culture Studies, of reproductive technology used by archives and libraries. Reproductive technologies like microfilming and digitizing shape how we view and remember history. Exploring a case study of newspaper representations of Panamanian Welterweight World Champion Boxer (1929-1936; 1938-1941), Alfonso Brown, I demonstrate how the absence of a grasp of the capabilities of reproductive technologies can lead to erasure and distortion of already marginalized communities of color and other under-represented populations in the historical record. Material Culture Studies conceptualization of reproductive technology as a material, or medium of representation warranting deep and rigorous consideration, is useful for computational archival science (CAS) as we move towards completely digital-based archives.**

Keywords—*Representations of marginalized populations, Racial implications of reproductive technology*

I. Theories Used in Art History and Material Culture Studies

In this paper I focus on the racial implications of reproductive technology used in archives and libraries. Art History and Material Culture Studies have not been a part of computational archival science spaces. They may seem unrelated to computational archival science, but some of their theories offer valuable benefits regarding representation and who gets to appear in the historical record.

Some theories of representation used in art history have already been introduced to archival scholarship as useful frameworks. Paul Conway, in 2010, draws on W. J. T. Mitchell's definition of representation in his discussion about building a digital collection [1]. Mitchell's theorizes representation as "always *of* something or someone, *by* something or someone, *to* someone." [2] Conway's adoption of Mitchell's theory also allows him to bring attention to the mediation that happens in the digitizing process. According to Conway,

> When considered as a form of representation, digitization of archival photographs comprises a means of communication between image and user in which the archivist, digitizer, system builder, and interface architect, play a fundamental mediating role [3].

I offer another valuable art historical framework for computational archival science regarding the multiple mediators Conway identifies. Social art history informed by semiotics, as defined by Keith Moxey, places an emphasis on historical specificity and teases out relevant social relations [4]. Moxey's framework contends:

> The study of visual representation will approach visual signs as if they were contiguous to and continuous with the signifying systems that structure all other aspects of the historical horizon that is the object of study. The work of art will be read as if its surface were part of the social fabric of which it was once an organic whole [4].

The relationships between the mediators, institutions (such as libraries and archives and their practices), and computer scientists, for example, has the potential to yield significant questions and insights regarding the selection of particular reproductive technologies.

Material Culture in the context of Art History, as defined by one of its earliest proponents, Jules David Prown, is conceived as:

> A study based upon the obvious fact that the existence of a man-made object is concrete evidence of the presence of human intelligence operating at that objects time of fabrication. The underlying premise is that objects made or modified by man reflect, consciously or unconsciously, directly or indirectly, the beliefs of individuals who made, commissioned, purchased, or used them, and by extension, the beliefs of the larger society to which they belonged [5].

The term 'material" points to an emphasis on the objects' materiality, or its physical and sensual dimension. This includes an exploration of the materials and their properties. While materiality is a critical component of material culture studies, materials have become a field in art historical studies. This emphasis on materials is underscored in the department name, "History of Art, Materials, and Technology" at University College London. The description of the department on their website states:

> This Degree offers a unique focus on works of art as physical objects. It combines knowledge of art history with questions of materiality and technology related to the time a work of art was made and subsequently as it ages and changes [6].

The focus on materials as mediators is a valuable lens for thinking about technology as a representational tool. This is especially important component when thinking about Computational Archival Science (CAS). Indeed, current work in Artificial Intelligence, like facial recognition software, which fails to recognize dark skin, demonstrates how a framework that

positions materials, technology [7], and those who use them as mediators is much needed.

II. CASE STUDY

The comparison of a hard copy of the February 1, 1927 issue of the French sports newspaper, *Match L'Intran* with its digital counterpart from a library collection in my research on 1920s Black Panamanian Welterweight Champion boxer, Alfonso Teofilo Brown was staggering. I found this newspaper in 2009 while browsing a flea market on the outskirts of Paris. I was so taken with the way Brown seemed to be glowing. He looked like a 1920s film star rather than a boxer. The materiality of the newspaper---the physical object---led me to a investigate the process by which a photographic image was translated and printed on to newsprint paper. Touching and examining this physical newspaper prompted questions, like why does Brown look distinctively different here than his appearance in other newspapers of the day? And why does this paper have a satiny sheen to it? Investigating all of my lines of inquiry directed me to the photomechanical printing process, rotogravure. Rotogravure is a game changer regarding representations of black phenotype in mass produced print media like newspapers. Rotogravure is critical to the creation of the glamorous, black athlete type.

Fig. 1. High-resolution cover image of *Match L'Intran* February 1, 1927

Using material culture methodology that focuses on deeply understanding the technology of production, I researched the newspaper as an object that included an inquiry into the technology. I realized that hard copy was printed using rotogravure, a photomechanical reproduction process used for newspapers that dramatically transformed how brown skinned

people appeared in the print newspaper medium all over the world. Rotogravure was a cutting-edge technology in the 1920s in western Europe and the US. It had the ability to capture details in dark tones, rather than reduce brown people to flat black, cartoonish forms. Rotogravure allowed brown people to be seen in newspapers as glamorous. Images like Nike's billboards of Lebron James and Kobe Bryant as monumental aesthetically compelling athletes owe much to Brown's cover of *Match L'Intran*.

Microfilm, microforms, and digitizing, employed in newspapers for archives and libraries, strip away all of the revolutionary advances made by rotogravure. The aesthetic strategies of subtle grey tones, and highlighting not only create a glowing quality, but it gives people of color access to glamour in print, and newspaper readers access to the image because you can actually *see* it.

Fig. 2. Digital database cover image of *Match L'Intran*, February 1, 1927

If we consider microfilm as a medium through which representations are created, we must examine the medium itself. What was it created to do? How does it work? Microfilm is photographic process that uses a silver-based film to reproduce data in a reduced size. It is inherently a high-contrast medium. As such, it is best suited to record very dark tones and very light tones. While some tones in between black and white are recorded, the majority of grey tones in an original document are minimized or erased. This suggests that microfilm is highly applicable for text-heavy documents since text is conventionally printed in dark black tones.

The practice of microfilming newspapers reaches back to the late 1920s when the Library of Congress began their major

filming project. Since Woodrow Wilson increased segregation in the federal offices during this period, there were no people of color involved in the Library of Congress's decision to use microfilm [8]. The decision makers failed to consider the technology's racial implications. *The New York Times* began filming and publishing their print runs in 1935 [9].

Microfilming newspapers was a widespread practice by the late 1950s [9]. The National Endowment of the Humanities United States Newspaper Program allocated $54.1 million to microfilm newspapers between 1982 and 2011 [10]. However, no value was placed on keeping the hard copies of these historic newspapers or improving the environmental storage conditions for them. They were disposed of or destroyed [11].

In the early 2000s when the Library of Congress began experimenting with the digital process for copying newspapers, they scanned microfilms, not hardcopies of newspapers. Digitizing flattens out an already distorted-microfilmed image. That means when we look at digitized pre-2006 newspaper images today, we see representations that are distorted by two different copying processes.

The stakes regarding historic black representation in one of the mediums that circulated and disseminated the most images, are very high. Commission on Preservation and Access Reports from 1989 acknowledge the inadequacy of microfilming related generally to images [12]. However, my research demonstrates the actual impact of microfilming, digitizing and rotogravure on brown people.

Representations of race in mass-produced printed media like newspapers, especially those of brown people, are inextricably tied to the material object---the hardcopies. If I didn't have the physical newspaper, I wouldn't have noticed the distinction in the printing quality of Brown's image. I wouldn't know about rotogravure, and its significant role in generating a major iconographic shift in representation for brown people. Technology used for copying, thus far, is no substitute.

Reproduction technologies like microfilming and digitizing of microfilms accompanied by the destruction of the physical newspaper, severely compromise and eliminate our ability to generate questions about representation of brown people in this widely circulated medium. Art History and Material culture studies bring methods for examining the implications of technology---be they aesthetic, racial, social and/or cultural to computational archival science. There is much to gain by putting them in dialogue. The National Archives and Records Administration's June 28, 2019 memorandum [13] detailing the administrations transition to completely electronic form as of December 31, 2022 speaks to the urgency of this conversation.

III. CONCLUSIONS AND FUTURE WORK

Collaborations between Art History, Material Culture Studies and CAS foster necessary and vital conversations that can yield meaningful changes regarding representation and inclusion. Towards that end, I recently created the initiative VERA (Visual Electronic Representations in the Archive) Collaborative. VERA Collaborative's mission is to raise awareness about the significance of aesthetic, cultural, and social implications of visual representations found in archives, providing a model for archives, libraries, museums, and cultural heritage centers around the world. It addresses the distortions and erasures in visual representations, linked to reproduction technology, that particularly impacts communities of color and other under-represented communities. VERA Collaborative partners with organizations like the U.S. National Park Service (NPS), the Library of Congress (LOC), the Maryland State Archives, and the Digital Curation Innovation Center (DCIC) to forge dialogues in order to generate informed decisions regarding reproductive technology.

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