

From (Archival) Page to (Virtual) Stage: The Virtual Vaudeville Prototype

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ABSTRACT

This article explores the difficulties archivists face in capturing, preserving, and representing performance and other ephemeral or intangible cultural expressions. It also examines the applicability of existing archival theory and practice for reconstructing historical performances in digital environments. Using the Virtual Vaudeville Prototype as a case study, the research considers the efficacy of new media technologies for those who strive to capture performative expressions to redress erasures and silences in the historical record. The article provides brief historical context for vaudeville as a mode of performance at the turn of the twentieth century, discusses the Virtual Vaudeville Prototype and the archival evidence upon which it was built, and considers Virtual Vaudeville as both an evidence-based project fashioned from archival research and as an archival record in its own right.

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KEY WORDS

Archives, Performance studies, Digital humanities, Digital arts and culture, Virtual Vaudeville, Digital technologies, Motion capture, New media

Archives provide societies with an opportunity to preserve cultural evidence; however, capturing and preserving temporal, event-based, ephemeral, and intangible cultural heritage such as performances, oral traditions, social practices, and festive events presents an ongoing archival challenge. The difficulties archivists face in capturing, preserving, and representing ephemeral and intangible culture create erasures, gaps, and vagaries in the historical record kept by archives; these erasures will ultimately not only make ephemeral works inaccessible, but will also systematically silence and render invisible the unique ways that indigenous and other cultures communicate and represent ideas, solve problems, and express human emotions. This article aims to reconcile the performative aspects of cultural heritage with the Euro-American archival tendency to privilege tangible—and often text-based—records, a practice that leaves cultures that rely on oral or other intangible modes of communication underrepresented in the archival corpus.

The research investigates one collaborative project, Virtual Vaudeville, which sought to answer the question, “Is it possible to archive a live performance?” Using the American theatrical tradition of vaudeville as a model, the Virtual Vaudeville team also aimed to revolutionize present-day representations of past performances by moving a historical performance into a digital environment. This study considers the Virtual Vaudeville Prototype as both a performance and as an archival record; in so doing, the research contributes to an ongoing discussion about the need for potential shifts or adaptations in archival theory and practice so that archives might better support the preservation of performance as a means of cultural expression. The research employs case-study and grounded theory methodologies to analyze data about Virtual Vaudeville from an array of sources including semistructured interviews with key project participants, internal project documents, and a variety of secondary sources. The study furthers the argument that archivists might reconceptualize archival traditions in performance, such as custodial relationships with records creators. The study also argues that collaborating with scholars in fields such as the digital humanities and embracing new media technologies as tools for documenting performance create new possibilities for archivists to capture and preserve performance and other traditions, practices, and events.

Background

The primary objective of the Virtual Vaudeville project was to use digital technology to address a problem fundamental to performance scholarship and pedagogy: how to represent and communicate the phenomenon of live performance. For the project team, this problem was especially pressing because the goal was to represent a performance tradition from the past.¹ One strategy

to address the problem of representing historical performance traditions has been to build physical reconstructions of historic spaces and to stage performances in them, as with London's famous Globe Theatre reconstruction. This solution, however, requires an unsustainable investment of money and land, and is feasible in only a limited number of cases. Another model employed to represent historical performance traditions is to collocate printed archival materials, thereby creating a performance-specific archives. For example, the Annenberg/Corporation for Public Broadcasting Multimedia Collection created a CD-ROM containing documents pertaining to Henrik Ibsen's play *A Doll's House*. Although the disk contains video clips of filmed performances, documents written by Ibsen, and sketches of costume and set designs, no attempt was made to re-create what an original performance would have looked like.² Finally, a third strategy used to represent historical performance traditions is the virtual re-creation of theatrical spaces such as the Chestnut Street Theatre Project, spearheaded by University of Washington professor Jack Wolcott. The Chestnut Street Theatre Project re-creates the Chestnut Street Theatre in Philadelphia in the eighteenth century.³ The interior drawings are impressive, and viewers enjoy an impression of what the theater looked like from multiple angles. Again, however, no attempt was made to re-create an actual performance within this virtual environment.⁴

Literature Review

While the bodies of literature that address archives and performance are vast, few points of intersection in the scholarly discourse connect them. Similarly, few archival scholars—those perhaps best positioned through craft, training, and scholarship to develop theories and methodologies to allow variable cultural forms and expressions to coexist within the same systems—attend to performance in their research. Currently, performing arts archives are primarily concerned with fixity and with tangible artifacts. Contemporary archival best practices suggest that subsequent to a performance, the work is preserved as documentary evidence in various forms of mediating artifacts: scripts, stage managers' and assistant directors' notes, dance notations, musical scores, costume renderings, set designs, lighting plots, videos, photographs, sound recordings, posters, playbills, programs, audience and press accounts, and 3-D items such as props and costume pieces. These remains that enter the archives, these traces that archivists attempt to preserve in ways that characterize their inter-relatedness, these remnants (what British theater scholar Matthew Reason calls the "detritus" of live performance) are all that remain to communicate the "aura" of the original performance.⁵ These tangible records have multiple purposes. Some are factual, such as databases that document an event occurring at

a particular place or over a period of time. Others attempt to capture the event so others can experience it.

Representations of performance in archives can be misleading, however. Because performance is an iterative practice, it is not always clear, for example, if the archival record stems from rehearsals or from a specific performance, or if it simply reflects ideas that were discounted. Furthermore, when documenting dramatic periods and events, demonstrations, battles, and outpourings of grief such as public funerals, how does the archivist capture the mood of the time or reflect what it meant to take part in or live through such experiences? Can archivists provide evidence of the past through the records selected and/or created for posterity, when human experience is inherently interactive, experiential, and performative?⁶

Research by archivists Sarah Jones, Daisy Abbott, and Seamus Ross suggests that because many performers use archives as sources of inspiration for new works, performance records should be more creative and experimental in nature, focusing on the potential for the artistic community to reuse documentary records that would otherwise be considered inactive archival records. Of documenting performance, Jones, Abbott, and Ross asserted that

[t]he temporal nature of performance causes tension: the fear of loss leads to an urgent desire to counter this through documenting, while the loss inherent in this process leaves many dissatisfied with the outcome. The representations that are usually created, such as the photographs and drawings, are often discounted as inadequate and unfaithful⁷

Moreover, because archivists and archives tend to privilege tangible—and often text-based—records, cultures that rely on oral or other intangible modes of communication remain underrepresented in the archival corpus.⁸ Literature in the disciplines of anthropology, cultural studies, and performance studies also suggests that collecting only tangible artifacts is both inadequate and exclusionary. Archival scholar and educator Jeannette Bastian used the record attributes of *structure*, *content*, and *context* in conjunction with Michael Buckland's nontextual definition of documents to support a theoretical framework that allows for performed cultural events (such as pre-Lenten Carnival celebrations in Central America and the West Indies) to be signifying objects and, by extension, documents.⁹ This argument suggests that the evidentiary nature of a document or record supersedes its need to be text based or, for that matter, tangible.¹⁰ Bastian therefore presented Carnival as an archival "document"—through the lens of a cultural production replete with context, structure, and content. Carnival, like other performances, in its purest and most authentic living and temporal form cannot be permanently fixed in boxes or on shelves.¹¹

Although library and information science scholar Deborah Turner has addressed the existence of "oral documents" (and by extension "oral records"),

and others have called for new ways of representing and preserving cultural expressions, few significant empirical archival studies have been conducted in this area.¹² Similarly, the fields of performance studies and cultural anthropology have developed bodies of literature that address the archives as an embodied space, but do not speak to archives as physical spaces or as realms of distinct professional expertise. These conversations about how to achieve something permanent from something fleeting and event based are happening concurrently, but not in collaboration. This article speaks to the intersection of concerns raised by scholars in the abovementioned fields: those who seek to pluralize archives and give voice/create counternarratives where process and power have created gaps, vagaries, and silences; and those who have expressed anxiety about a limited ability to capture or document the experience of live performance.

The Virtual Vaudeville Project

The Live Performance Simulation System's Virtual Vaudeville prototype was conceived as a response to the problem of archiving performing arts. The product of collaboration among a diverse group of U.S. scholars including computer scientists, 3-D modelers and animators, theater practitioners, and historians of both theater and music, the prototype is a single-user 3-D computer game that allows users to enter a virtual theater to watch a simulated performance. Initiated in 2001, the project sought to use digital technologies to answer the question: "Is it possible to archive a live performance?" Using motion-capture technology, artificial intelligence techniques, a 3-D game engine, and a human actor, the project aimed to represent a historical performance tradition using a virtual-reality environment to fully simulate the experience of attending a live performance. These scholars sought to proffer an archives of experience, one that would incorporate elements of sight and sound in addition to the interactivity of a live audience. Scholars immersed in the Virtual Vaudeville project were, in part, testing hypotheses about historical performance practices and engaging with historical performance traditions as performance (rather than through the mediation of scripted theater or film).

The Virtual Vaudeville Project aimed to test the potential of virtual environments to provide high-quality theater experiences to remote audiences. One objective of Virtual Vaudeville was to simulate a feeling of "liveness" in a virtual theater: the "sensation of being surrounded by human activity onstage, in the audience, and backstage, and the ability to choose where to look at any given time (onstage or off) and to move within the environment."¹³ In a radical departure from existing methods, the Virtual Vaudeville team proposed using motion-capture technology to capture real-world performances by highly

skilled professional actors, singers, dancers, acrobats, and musicians, thus re-creating a historical performance for a digital environment and, at the same time, fashioning an “archives” of that performance. In so doing, they hoped to make important advances in the design and implementation of virtual environments, advances that would build on prior successes in creating photorealistic simulations of real 3-D environments by introducing a large quantity of complex human performance data. Virtual Vaudeville was intended to constitute an invaluable work of applied scholarship and to provide an “unprecedented resource for visualizing past performances and testing hypotheses about historical performance practices.”¹⁴

The long-term goal of Virtual Vaudeville, then, was to develop a flexible set of techniques and technologies that scholars and theater practitioners could use to simulate a wide range of performance traditions, from classical Greek theater to Japanese Noh theater. As Principle Investigator David Saltz stated in his proposal to the National Science Foundation (NSF),

A conventional published monograph can pick and choose details to examine, and so lacuna and even contradictions in the historical analysis are easy to overlook. The imperative of precisely recreating both on-stage and off-stage events will demand an unprecedented degree of scholarly thoroughness and rigor. . . . It will provide an unprecedented resource for students to engage with historical performance traditions as performances (and not as literature or film).¹⁵

Saltz’s simulation model is particularly useful for representing vaudeville as a performance tradition. While archives have traditionally struggled to document, maintain, represent, and ensure provisions of access to performances of all kinds, vaudeville presents a specific challenge as a popular art form. The term “high culture” was introduced in the late nineteenth century by English poet and cultural critic Matthew Arnold. Arnold conceived of culture as the “best that has been thought and said” in the world.¹⁶ In contrast to popular or mass culture, Arnold saw high culture as a force for moral and political good. Vaudeville, as a form of popular culture that emerged just following the publication of Arnold’s seminal book, *Culture and Anarchy*, did not qualify as “high culture” or “high art.” As such, vaudeville, as a popular form, was even less likely to attract the attention of a nascent archival field concerned primarily with historical manuscripts and government records. Today, the significance of this history is immediately apparent for vaudeville scholars. Each Virtual Vaudeville team member interviewed for this project identified the lack of existing archival documentation on vaudeville as a motivating force behind creating the Virtual Vaudeville prototype.

About Vaudeville

During the late nineteenth and early twentieth centuries, the entertainment industry in the United States grew rapidly. Two new forms of variety entertainment—burlesque and vaudeville—joined circuses, sporting events, and minstrel shows. Together, these performative practices comprised the nexus of the postindustrial popular culture industry. Variety entertainment consisted of several short acts performed consecutively; it often included feats such as ventriloquism, acrobatics, and magic tricks.

Vaudeville was variety entertainment. A highly visual, nonliterary form of American entertainment with a complicated delivery system, the remnants of vaudeville survive in stand-up comedy, stage and film musicals, and other modern performative practices.¹⁷ From its earliest days, vaudeville struggled against prevailing Victorian values: early forms of variety theater had an insalubrious reputation, and, in the late 1800s, a growing realm of inexpensive amusement inspired the cultural elite in the United States to attempt to “reclaim music, drama and the arts from the unwashed masses.”¹⁸ This self-selecting cultural noblesse sought to preserve art, to save artistic expression for those who truly appreciated quality and beauty. Vaudeville represented the opposite of this high-culture paradigm. Associated with roughhousing and prostitution, vaudeville was pure popular entertainment that consisted of a highly diverse series of very short acts, known as turns. The turns ranged from singing groups to animal acts, from comedians to contortionists, from magic tricks to short musical plays.

Vaudeville had an effect on popular culture that is still evident: for example, many contemporary film and television ethnic stereotypes—Jewish, Irish, Italian, African American—derive from the ethnic caricatures that were strongholds of vaudeville comedy. Vaudeville-era comedian Frank Bush, the single complete act in the Virtual Vaudeville prototype, exemplifies this brand of ethnic humor.¹⁹ After the Civil War, many comedians performed in blackface or donned Irish or German costumes and makeup. Frank Bush specialized in “the Jew” and “the Yankee.” He made his name as solemn, bespectacled Isaac Levy Solomon Moses. Dressed in a long black peddler’s coat and sporting a pointed beard, he set the standard for what were considered “benign” Jewish characterizations on the stage.²⁰ Audiences of the 1900s and their hearty response to Jewish character comedy and blackface exemplify the historical era predating the terms “politically correct” and “culturally sensitive” in the United States. Frank Bush flourished as a “Jew comic” from the 1870s to the 1890s. Many ethnic Jews also performed, but they specialized in blackface or engaged in singing and dancing acts.²¹

Many vaudeville acts reflected the enthusiasms and anxieties of their time, particularly the integration of new immigrant groups into mainstream American culture and the marginalization of African Americans from that same culture.²² As David Nasaw suggested, vaudeville gradually “deracialized most immigrant groups, but continued to categorize blacks as racially separate and radically Other.”²³ In its prime, vaudeville nonetheless appealed to a broad cross-spectrum of the public, representing nearly every class and ethnic group. The wealthiest patrons could purchase exclusive box seats, while working-class spectators could purchase inexpensive seats in the galleries. Vaudeville, as an event-based cultural form, was believed to have something for everyone.²⁴

The Live Performance Simulation System: The Virtual Vaudeville Prototype

Virtual Vaudeville allows the user to switch between two very different ways of experiencing the simulated performances. In what we call “invisible camera” mode, viewers fly through the 3D space to observe the performance from any position in the theatre and zoom in as close to the performers as they please. Alternatively, the viewer can adopt an embodied perspective, watching the performance through the eyes of a particular member of the audience.²⁵

In September 2000, the National Initiative for a Networked Cultural Heritage (NINCH) held a Building Blocks conference in Washington, D.C. The conference was designed to bring together ninety humanities scholars to articulate by field and across disciplines the most pressing needs in the humanities that networked computing could address. Funded by the Rockefeller Foundation, the National Science Foundation, and the Gladys Krieble Delmas Foundation, Building Blocks was the first step in a new Computer Science and the Humanities Initiative designed to “create a framework of shared understandings and vocabulary with which [humanities scholars could] build practical agendas for working with computer scientists.”²⁶ The specific and immediate goals of Building Blocks were to map a long-term research agenda for joint humanist-scientist work and to outline a series of short-term projects to answer the most pressing of the identified needs. Another goal of the NINCH project was for scholars to leave the conference with the beginnings of a grant proposal to submit to NSF. NINCH was, in many ways, NSF’s way of reaching out to the humanities.

Among those selected to participate in NINCH’s Building Blocks session were performance studies scholars David Saltz (University of Georgia), Bruce McConachie (University of Pittsburgh), and Susan Kattwinkel (College of Charleston). Grouped together as much by chance as design, these scholars

brainstormed digital initiatives they felt would support their scholarship and pedagogy.²⁷ The group considered circuses, earlier forms of variety entertainment, as well as minstrelsy. Kattwinkel and McConachie, however, both vaudeville scholars, were particularly interested in blackface, immigrant performers, and working-class audience issues.²⁸

Following the NINCH session, David Saltz, whose work at the University of Georgia was in the use of interactive technologies in live performance and who had unfettered access to a cutting-edge computer department and information technology scholars, took the lead on what was then termed the Live Performance Simulation System project.²⁹ Several theater historians who focused on the acts represented in the prototype as well as music and theater architecture joined Saltz, McConachie, and Kattwinkel. Last, the team included computer scientists from the Georgia Institute of Technology and the Naval Postgraduate School in Monterey, California, who brought 3-D animation skills and motion-capture technology to the project.³⁰ In the end, the Virtual Vaudeville team comprised a diverse array of scholars from around the country, including computer scientists, 3-D modelers and animators, theater practitioners, and theater and music historians.

The group selected vaudeville as an object of study not only because Kattwinkel and McConachie were vaudeville scholars, but also because the literary aspects of vaudeville were its least significant attributes. While published sketches exist, they do not capture what is most arresting about vaudeville: the energetic variety of performances and performers and the larger-than-life style. Also, historically speaking, until recently, there existed a dearth of theater scholarship devoted to popular forms; rather, theater scholarship focused more traditionally on high art.³¹ Vaudeville, therefore, presented a perfect unit of study: not only was it a visually demanding art form, but a significant amount of raw research remained to be done. Temporally, vaudeville also provided rich ground for reconstruction:

I really like it because it's recent enough that you can really reconstruct it with a good bit of detail. So let's say we were doing Greek theater. There's so much speculation involved in every detail that it would be hugely speculative. Any little detail: what the actor's costumes looked like, how they moved, what the set looked like. You know, all of these core issues. Whereas with vaudeville, there's tons of material. It's right at the dawn of the film age, so even if a lot of these acts are recorded, a lot of them aren't, so it's not like it's redundant. But we do have that kind of information.³²

Finally, the group selected vaudeville because it would allow them to explore cultural norms in the turn-of-the-century United States. From the 1880s through the 1920s, larger vaudeville productions included several kinds of vaudeville acts, including blackface comedy acts, dance numbers, contortionist

performances, juggling acts, singing groups, comic monologues, and skits of full-length plays. In short, because of early vaudeville's diversity of acts and audience members, re-creating a vaudeville performance would offer scholars more than simulating the performance of a "classic" piece of dramatic literature such as the aforementioned *A Doll's House* by Henrik Ibsen or, for that matter, a circus.³³

The group submitted the proposal for the Virtual Vaudeville Prototype to the NSF in response to a call for proposals for Phase II of its Digital Libraries Initiative, which began in 1998. Phase I of the initiative had begun in 1994 with six proposals funded from 103 submissions. Highly competitive, Phase II of the Digital Libraries Initiative received over four hundred proposals of which approximately fifty were funded, Virtual Vaudeville among them.³⁴ At the time, various inquiries were made regarding live performance that fell within the NSF's areas of interest. Some were associated with dance and choreography, and a considerable number were linked to human motion, gesture recognition, and sign-language recognition. Many of the researchers sought funding to simulate human capabilities in robotics.³⁵ While the National Endowment for the Humanities (NEH) or the National Endowment for the Arts (NEA) might have been a more natural fit for funding a project such as Virtual Vaudeville, the NSF at the time had a budget in excess of \$5 billion, while NEH labored under a budget closer to \$150 million.³⁶

The NSF made the awards based on a peer-review process and the final decision of the program manager on project funding. Virtual Vaudeville was considered unique as one of a few proposals dealing with intangible cultural heritage. The NSF had received a number of proposals related to endangered languages and oral traditions. Several dealing with performance had also been submitted, but Virtual Vaudeville was generally considered a strong proposal, and the NSF had high hopes that it would break new ground in establishing a line of research that the computer science community (conservative in terms of what they consider legitimate research topics) would receive and take as legitimate. The NSF hoped as well that Virtual Vaudeville would further human understanding of virtual-reality environments and the ability to capture them in a way that people would find appealing and informative.³⁷

Key to the Virtual Vaudeville proposal was the depth of the planned collaboration between technology, scholarship, pedagogy, and art. Virtual Vaudeville was created to make a significant contribution to all four domains simultaneously, rather than merely using any one in the service of the others.³⁸ David Saltz had been working with a group of scholars to integrate theater and digital performance using Shakespeare. He understood that the Virtual Vaudeville team was naïve about the ease with which a project such as this could be accomplished.³⁹ For this reason, in addition to his access to technological resources at

the University of Georgia, he was selected as principal investigator on the project.⁴⁰ The scope of the project, as proposed, was much larger than what the NSF eventually funded. Initially, the project team requested \$3 million to reproduce four vaudeville acts in a virtual environment. The project was whittled down to one act with the idea that later endeavors would complete the remaining acts.⁴¹ In the end, the NSF funded the Live Performance Simulation System through its Digital Libraries Initiative with a grant for \$900,000, supplemented by an additional \$110,000 from the State of Georgia.⁴² With this funding, the project team created the Virtual Vaudeville Prototype.

The complete Virtual Vaudeville Prototype 1) simulates a single act by vaudeville comedian Frank Bush using a live actor and motion and facial capture; 2) offers a “flythrough” of B. F. Keith’s Union Square Theatre as it would have appeared during the vaudeville era; and 3) presents possible responses from six individual spectators. To accomplish the Frank Bush act, David Saltz—as he would in any theatrical production—wrote a script, hired an actor (George Contini), and directed a scene. He blocked the actor’s movements and made decisions about tone and quality. The difference in the case of Virtual Vaudeville was that Contini wore an optical motion-capture suit and, later, optical facial motion-capture markers.

Optical motion capture relies on a series of light-reflective markers placed at key places on the body, typically at joints, but anywhere necessary to capture data. Facial motion capture uses a larger number of markers placed on the facial muscles to capture the intricacies of facial expression. When artists use motion capture for animation, fewer markers are desirable so that animators can further manipulate rudimentary movement and design their own characters. A typical motion-capture system uses anywhere from four to thirty-two cameras to capture the subject’s movement. The Virtual Vaudeville team at the University of Georgia used eight cameras placed strategically around a small studio black box theater. They chose Autodesk’s motion-capture software Filmbox (FBX) to capture data from the markers and analyze position, angle, velocity, and acceleration. The team then animated the movement with Maya, Autodesk’s 3-D computer graphics software, reproducing Contini’s movements on a 3-D model of Frank Bush.⁴³ This process is, in part, re-created on the Virtual Vaudeville website.⁴⁴ They created the flythrough of the Union Square Theatre, on the other hand, from visual images mapped into Maya. Frank Mohler, Virtual Vaudeville’s designer, had done extensive archival research into the Union Square Theatre and created a set of blueprints from the dimensions he uncovered in the archives.⁴⁵ David Saltz took a series of photographs representative of vaudeville era architecture and interior theater design. Details from these images were painstakingly reconstructed in the Maya animation environment.

The prototype opens up for historical investigation a range of ethnic, gender, and class interactions during America's industrial age.⁴⁶ From the perspective of audience interaction, the team intended viewers to be able to select one of four spectators, each representing a different socio-economic group common in nineteenth-century America. They created rich and complex biographies for these spectators: Mrs. Dorothy Shopper, a wealthy socialite attending the performance with her young daughter; Mr. Luigi Calzilaio, an Italian immigrant "fresh off the boat," attending the performance with his more Americanized brother; Mr. Jake Spender, a young "sport" sitting next to a chorus girl (with whom he may or may not strike up a relationship, depending on the viewer's choices); and Miss Lucy Teacher, an African American schoolteacher watching the performance with her boyfriend from the second balcony, where the theater's segregation policy confines her.⁴⁷ These biographies, created from course-based archival research in the theater department at the University of Pittsburgh, were written to motivate the intentionally individuated responses of each audience member. The team envisioned an interactive audience experience:

The people in the boxes, a woman in the booth, Dorothy Shopper and her daughter; then the Italian and the Irishman sitting in the balcony and the African American in the balcony. We did elaborate biographies for them. And the idea was that there would be some artificial intelligence so you'd be sitting there and you have like an avatar and you could applaud or laugh or make a joke—a joke that was appropriate to you. And that person would respond appropriately to your joke. So the [Naval Postgraduate School team] actually provided us with a game engine so we could script those interactions.⁴⁸

The interactions were subsequently scripted, and some of the audience responses are actualized in the prototype: a set of six prerendered audience members react to Frank Bush's comedy act. Their facial expressions were informed by the aforementioned biographies and captured by optical facial motion-capture technology. Acting students at the University of Georgia were used for this motion capture. Much like the original plan for four vaudeville acts, the highly interactive audience experience that the Virtual Vaudeville team sought to deliver was never fully realized as a result of limited funding and time constraints.

The Virtual Vaudeville team was acutely aware of the imperative to consider both the strengths and weaknesses of simulation as a representational method; among their chief concerns was "Disneyfication," or presenting an idealized view of the past and perpetuating historical stereotypes and prejudices. To this end, they had a strong desire to tackle the issue of blackface and minstrelsy in America's theatrical past. Asking questions such as "Through whose eyes do we see?," "How do we construct Otherness?," and "On what does the construction of our own identity depend?" were important to the scholars

working on this project: they sought to bring critical questions of class, race, and gender to the educational table, using archival evidence and emerging technologies to examine these themes. Discussions about how to address these concerns, however, precipitated an internal team controversy about including blackface in the prototype.

[B. F. Keith's theater] had an ethnically mixed audience. It had the balcony, you know, with segregated African American spectators and that was something that we wanted to be able to look into and explore, too. And then we were deciding, "All right, well, what acts are we going to do?" and we came up with four acts that we were gonna be researching: one was going to be *Sandow the Magnificent*, one was going to be *the Four Cohans*, one was going to be *Maggie Cline* and then we were going to do some sort of ethnic humor which was the sort-of definition of Vaudeville humor and at that point the group decided blackface would be a good thing to study. I was there. And I said, from the sort-of scholarly table, that that all sounded reasonable and good. And so we decided on that.⁴⁹

Each team member recollects that blackface was part of their initial discussion. The particular recollections, however, vary: "The way I remember it, [we were] interested in doing blackface and when [David Saltz] was getting ready to put in the NSF proposal he was told that some Congressman sent it back and told them that he wouldn't allow American tax dollars to pay for filth for his kids to watch on the internet."⁵⁰

A representative from the National Science Foundation was interviewed for this research study. He contends that the National Science Foundation does not make a practice of censoring the work of scholars funded under its programs. Nonetheless, projects must meet requirements to qualify for NSF funding. Among those requirements is, for example, a stipulation that projects must be based in the United States. This rule influenced the Virtual Vaudeville team's decision to use American vaudeville as a unit of study. Also, because NSF funding is sourced from the federal government of the United States, all limitations that apply to the application of federal funds also apply to NSF-funded projects (such as alcohol exclusions, etc.). Because of these limitations and exclusions, and because of the work involved in submitting a grant proposal to the NSF, it is not uncommon for researchers to contact NSF program directors to inquire about the NSF's interest in or potential willingness to fund a given project.⁵¹ It is unclear whether the team ever held a conversation specifically about blackface with an NSF project manager.

David Saltz, whose participation in the project was uniquely liminal—part scholar and technology specialist, part artist and theatrical director—realized that simulating the scene would require real actors, *real people*, in blackface. At the same time, Saltz received word from team members at the Naval Postgraduate

School and the Georgia Institute of Technology that doctoral students working on the project were concerned about losing their funding as a result of their involvement in a project that utilized blackface. From Saltz's perspective, the difference between studying blackface and simulating it is significant:

Well, we're simulating it. And what are the implications of simulating it? So I'm going to actually have to have a white actor do blackface? And then how do we deal with that? . . . Once you start doing blackface and putting it out there it is extremely sensitive. . . . [F]rom a scholarly standpoint, studying blackface, yes, but how are we going to simulate it? What does that mean?⁵² One of the interesting theoretical issues with simulation in general is that when you're looking at it there's one risk that—whenever I give a talk about this, I say one of the dangers in general is the distancing. That you sort of create this vision of completeness that's not real. And we work against that by providing all of our scholarly sources and materials in the footnotes, but it's still a[n] immersive experience. So when we were talking about it with the blackface we were actually propagating blackface. And somebody can read into it and provide all the commentary they want about it, but if they don't—and even if they do!—the first experience is blackface.⁵³

Another team member recalls that

there was a lot of legitimate conversation amongst ourselves about that. About, "Well, how is the site going to be used?" and if we did a blackface performance, how might that get in the way of what we were trying to use the site for and how might that cause the site some issues and how might that obscure our purpose of it? We can put it in there and have a scholarly conversation about it like every other aspect of the show, but not everybody would be able to do that. So, I recall that I was actually okay with waiting on that. My thought was, "Well, if we're going to think big, it'll get bigger." . . . But there certainly would have been at least some blackface characters somewhere, if not like really a minstrel act. I don't remember the word "filth" being used. I do remember that there was some outside pressure not to do that.⁵⁴

Finally, Saltz concluded, "[Beyond the issues of simulation] we talked about what would be a good representation of vaudeville and, well, [blackface] should have been at the very beginning of the project. If we wanted to look at blackface, which was fascinating, then first of all, we needed a different group. We were all white [*laughs*], none of us had that specialization and we'd need to spend a lot of time reflecting on exactly how we were doing it."⁵⁵

Although the blackface issue was resolved, over time, project team members developed conflicting expectations for the project. For Saltz and the historical/creative team, the goal was to create a polished tool. For the technical team, on the other hand, it was a proof-of-concept project. Working separately, the technical teams from the Naval Postgraduate School and Georgia Tech delivered minimal prototype functionality. The Naval Postgraduate School team delivered

the artificial intelligence, but the team at Georgia Tech never implemented it. Eventually, in the face of halted progress, funds were diverted from Georgia Tech to create the website as it exists today, with eight prerendered audience member perspectives.⁵⁶

Although NSF project managers were disappointed by what they deemed “minimal reporting” back to the agency from the project team, they also reported that they did not receive a proposal for the renewal of the Virtual Vaudeville project.⁵⁷ When asked why the team did not apply for additional funding, Susan Kattwinkel stated that “essentially [NSF funding] allowed us to basically solve the problem: ‘How would this project get done?’ And then once we had solved the problem, NSF wasn’t interested in us actually completing the project. They were like, ‘Well, you’ve created the system, you’ve created the technology, you’ve worked together and that’s what we wanted.’ And then they weren’t interested in doing it anymore.”⁵⁸

The Virtual Vaudeville project team strove to create a prototype realized in a fully immersive game environment. From the beginning, the focus was on creating the world of the performance: 3-D models of the theater, a house populated with audience members, the stage act, and multiple “player” perspectives. They also imagined a virtual environment in which the audience could use embedded hyperlinks to retrieve historical information about a performance culled from archival repositories.

Vaudeville in the Archives

Manuscripts, paintings, sculptures, films, and recordings are artifacts that can be preserved and archived for subsequent generations to appreciate and analyze. Live theatre, however, is ephemeral. Is it possible to archive a live performance?⁵⁹

Vaudeville producers such as Tony Pastor in the 1880s and, especially, B. F. Keith and E. F. Albee in the 1890s gave birth to vaudeville by turning earlier forms of variety theater into “respectable” family entertainment. Keith and Albee introduced “continuous vaudeville,” which became standard practice at the turn of the century.⁶⁰ The performances ran nonstop all day and into the evening, allowing spectators to enter the theater at any time and stay as long as they liked—not unlike modern television. The Virtual Vaudeville Prototype is set in 1895 in B. F. Keith’s New York vaudeville venue, the Union Square Theatre. This theater embodied all of the “respectable” practices that Keith and Albee had established in theaters in Boston and Philadelphia, and it set the pattern for subsequent vaudeville theaters throughout the country.

Unfortunately, the Union Square Theatre no longer exists, and archivists to date have not unearthed photographs of the theater's interior during the period in which the Virtual Vaudeville simulation is set. As previously stated, Frank Mohler, Virtual Vaudeville's designer, developed the basic reconstruction design for the Union Square Theatre after conducting extensive archival research into the theater's history. He discovered that the nineteenth-century Union Square Theatre, at 58 E. 14th Street in Manhattan, existed in three distinct versions, the result of renovations. The reconstruction of the theater for the prototype was based on Mohler's archival research. He found the evidence in newspaper clippings, drawings, theater programs, New York City building code laws, dimensions recorded in monographs from the time, and photographs of the exterior of the theater.⁶¹ Although few published studies provide a close reading on Tony Pastor and his theater, an archival record exists of the vaudeville acts performed there and of Pastor's theater in general. Substantial artist and business records from Pastor's theater provide logistical information such as stage size and scenic instructions.⁶²

In the 1990s, theater historians, working without the benefit of cultural resource managers, encountered anxieties over intellectual property rights in an array of digitization projects with which they were involved. So, too, did the Virtual Vaudeville team.⁶³ Historically, from as early as the Elizabethan age, theater artists resisted the printed script due to copyright concerns: in part, scripts meant anyone could perform a playwright's work. Equally important, however, they understood that theater is temporal, a form of art and entertainment meant to be performed rather than read. As project member and College of Charleston professor Susan Kattwinkel asserted:

Ben Johnson [1572–1637] was the first one to really publish his scripts as literature. So we did that with legitimate theater but not with vaudeville, not with popular theater. Even the scripts that existed for popular theater wouldn't have been published. People didn't read them like literature the way they do regular plays. So when we have them it's because they were part of usually some manager's collection that just didn't get thrown out.⁶⁴

As a result, script research for the vaudeville era proved challenging. Theatrical scripts, while among the most prolific source of theatrical records, are nonetheless "notoriously difficult to find for historical performances."⁶⁵ That performing arts archives now place a high premium on collecting and preserving theatrical scripts is a reaction to a twofold problem: scarcity of printed scripts in archival repositories and a high demand for these printed materials by performance studies and literature scholars. In addition, a reverence for the dramatic script exists in part *because* performance is notoriously difficult to capture. A scholar conducting research in "legitimate" theater might expect to find scripts among the detritus. This, however, is not the case for vaudeville:

Up until recently nobody was saving TV scripts, scripts for TV shows. It was just something that “Well who would save that?” But now, people do. Now, these are archived and saved. But I think you’d be hard-pressed to find scripts of *I Love Lucy* and stuff that was popular entertainment. People wrote it, they tossed it away. It was on TV, that was the end of it. They didn’t save those things. And popular theater was the same way.⁶⁶

It is true that in the United States recordings of such things as television shows prior to the early 1970s are difficult to recover because studios reused the videotapes on which they were recorded. Many seminal performances—that were videotaped—are gone.⁶⁷

Despite the challenge of finding vaudeville recordings from a time when film was new and documenting and preserving popular culture were not priorities, vaudeville joke books—short sketches published for performers and amateurs alike—can be found in relative abundance in performing arts archives. Harder to find in these same repositories are longer scripts such as those performed by the Four Cohans, a second act the Virtual Vaudeville team intended to restage. This also proved challenging for the Virtual Vaudeville team as they conducted their archival research.⁶⁸ Despite these challenges, the team located unabridged theatrical scripts of Four Cohan plays, as they existed. A wholly separate endeavor involved trying to find the associated sheet music.⁶⁹ Because many vaudeville performances were musical acts, locating a script in an archival repository without accompanying music renders the record incomplete. One of the most treasured finds turned up in the vaudeville archival research was not found in an archival repository. As far as scholars and researchers know, no film footage exists of vaudeville comedian and Virtual Vaudeville “star,” Frank Bush. This was, in part, what drew Virtual Vaudeville team members to attempt to re-create his act. In their research, they discovered that an Edison wax recording of Bush existed, which they subsequently tracked down and retrieved from the only existing source: a seller on eBay.⁷⁰

In addition to scripts and early film footage, Virtual Vaudeville research turned to photographs and cabinet cards—early trading cards for theatrical artists. In the cabinet card tradition, one could purchase postcards of performers in various roles, posed as if they were on stage. However, as Susan Kattwinkel cautioned, “[the actors are] always posed for a camera. People use those things for research, for trying to reconstruct what a performance might have looked like, but of course you’ve got to be very, very careful with that kind of material because it was staged for the still camera.”⁷¹ Kattwinkel’s note is well taken: the mediation of the pose and the camera renders these images problematic in determining historical facts. The team did archival research for representative images beyond the cabinet cards at the Harvard Theater Collection, the Library

of Congress, the New York Public Library, the Harry Ransom Center in Texas, and the Museum of the City of New York.⁷²

As previously stated, members of the Virtual Vaudeville team strongly asserted that the archival holdings related to vaudeville are scarce and insufficient:

The Library of Congress records for vaudeville are not good. There's a lot of stuff—again, I've been there looking for Tony Pastor stuff—they have a lot of records for things that used to be registered there where they used to have copies and then they just didn't anymore. It was Vaudeville stuff and people just threw them out. They don't exist anymore. . . . You know, we picked some of the main acts, the big Vaudeville acts from the period. We used B. F. Keith's big house because there was a lot of information on that, but, because vaudeville continues to be sort of under-analyzed, and library collections didn't keep their stuff it's a really good thing for putting online and using the materials that we have to pull it all together from various places and put it in one place so that we can look at it altogether because the information on vaudeville, even now, is scattered.⁷³

The Virtual Vaudeville team did find significant amounts of tangible archival evidence regarding the composition of vaudeville audiences. Theater critics at the time paid particular attention to the roles and reactions of the audience, as did individual performers. Archival documentation of audiences exists in newsprint, diaries, and autobiographies. Substantial evidence exists about audience behavior, as well as some evidence of who these theatergoers were and where they sat in the theater.⁷⁴ From this archival research, students in one of Bruce McConachie's courses created detailed biographical sketches for the four aforementioned interactive audience members. Finally, in an inspired turn toward restaging the archival record, the 3-D model of German bodybuilder and vaudeville "strongman," Eugen Sandow, is based on measurements taken of Sandow in 1894 by Dr. Dudley Allen Sargent of Harvard University.⁷⁵

Archiving (Virtual) Vaudeville

Virtual Vaudeville team members were interested in scholarly engagement and debate. They hoped that other scholars might take issue, providing evidence that refuted their virtually reunified vision of vaudeville.⁷⁶ While this did not happen, the prototype does successfully demonstrate—in a historical snapshot—the archival potential of motion capture and other new media technologies. The prototype can also be read as an archives: it is a point of view, locked in time. It is a historical work rooted in the 1990s and manifested in the earliest parts of this century that speaks to the questions performance studies scholars were asking at the time and to the evidence available to them. It speaks to a time

when performance studies scholars were concerned with re-creating historical spaces and digitizing historical performances. The archives that supported the creation of the Virtual Vaudeville Prototype—the Library of Congress, the Harvard Theatre Collection, the Performing Arts Library at New York Public Library/Lincoln Center, and the archives at the University of Illinois at Urbana-Champaign—hold only print and digitized records. These do not capture or represent vaudeville in the same visual, experiential way that the Virtual Vaudeville Prototype does. Although Virtual Vaudeville is mediated through the lens of theater and music historians, 3-D animators, and game designers, as a record, it is an aggregate representation, based on historical, archival evidence, of the cultural artifact that is American vaudeville.

The Virtual Vaudeville Prototype is both performance and record: as a performance, it maintains the broad, comical gestures associated with vaudeville acts through Saltz's direction and the actor's knowledge of vaudeville; as a record, the prototype documents vaudeville's role as a symbolic representation of the cultural diversity of early-twentieth-century America. Vaudeville—an amalgam of centuries-old cultural traditions, including the English music hall, antebellum minstrel shows, and Yiddish theater—was among the earliest forms of entertainment to cross race and class boundaries. The Virtual Vaudeville Prototype preserves this cultural knowledge by deftly navigating the liminal spaces between the performance and the archives.

Virtual Vaudeville is also an example of a record that has clear and specific evidentiary properties and currently exists outside a custodial archival paradigm. The Virtual Vaudeville website—more specifically, the server on which it resides—is the only place where all of the Virtual Vaudeville information is collocated, making it one of the most robust single repositories of vaudeville materials in existence. It is also an artifact of what was technologically available at the time. Given the creative and scholarly work that David Saltz and Frank Mohler undertook to restage the theater architecture, the prototype arguably takes on additional archival qualities. The model itself is evidence: the blueprints were created from narrative descriptions, and the photographs that Saltz took were digitally mapped onto the virtual reality canvas that became the prototype.⁷⁷ The Virtual Vaudeville Prototype is currently housed on a server in the theater department at the University of Georgia where David Saltz checks it with some frequency.⁷⁸ What will happen, however, when and if Saltz leaves the university?

The issue of preserving technology, I could go on about that ad infinitum. But that's one of the problems with all of the stuff. I heard all of these amazing presentations, but nobody ever knew anything about them. Like this super high res[olution] version of Michelangelo's *David*. I think it's part of the mindset of the research community particularly in the sciences where you do this proof-of-concept research. They develop it but they don't do anything with it.

The sustainability of the technology was at the forefront of our minds from the beginning.⁷⁹

If no intervention occurs, the prototype will also be lost or become obsolete. As a record, the prototype creates the same problem team members were attempting, in part, to solve. Unlike archival practitioners working with digital and digitized records, the Virtual Vaudeville team knows little about file migration, stable formats, and metadata. Indeed, as of the writing of this article, the Virtual Vaudeville Web page has been available only intermittently. The prototype and its attendant components require the same kind of creative archival thinking in this century that vaudeville did a hundred years ago. Archives and archivists are specifically—and uniquely—qualified to manage the preservation and stewardship of digital culture. Even if archivists do not take physical custody of the prototype, acting in an advisory role for the Virtual Vaudeville team is one way to move forward, furthering the argument that archivists might reconceptualize archival traditions where performance is concerned, including custodial relationships with records creators. Here is a clear opportunity for archival intervention and perhaps also an opportunity to redress the gaps and vagaries inevitably created when cultural expressions and other performative forms do not rise to the level of the Western archival threshold.

Conclusion

While performing arts archives supported the creation of the Virtual Vaudeville Prototype, its creators were, from the outset, dissatisfied with the existing archival materials available to them. This is not uncommon. That the Virtual Vaudeville team now joins a larger group of performance studies scholars seeking to create their own archives, however—and so many working without the benefit of professional archivists—speaks directly to the inadequacy of the archival endeavor where performance is concerned. It also speaks to issues of outreach and public relations. The Virtual Vaudeville team did not choose to exclude archivists. On the contrary, they simply had no idea what the benefits of working alongside a professional archivist might be. For the artist, the primary task is to create, not document. For the archivist, the task is to preserve, not capture. While it may be common knowledge among practicing archivists that working in tandem with records creators is the only way to capture and preserve some records, these collaborative relationships are rarely borne out in practice between artists and archivists.

Similarly, collaborating with scholars in fields such as digital humanities and embracing new media technologies as tools for documenting performance create new possibilities for archivists to capture and preserve performance

and other ephemeral traditions, practices, and events. Can motion capture and other new media technologies aid in preservation efforts by transmitting the embodied knowledge of the actor? Many technologies that could serve this function fail to connect the human element. Motion-capture data, on the other hand, directly represent human movement. Although these data can, as this case study shows, be manipulated, they provide one way to transmit culture in digital environments. For example, the Hachimura Laboratory in Japan has been working with motion capture as part of a comprehensive plan to safeguard Japan's intangible cultural heritage.⁸⁰ Working toward a digital archives of traditional Japanese performing arts, Hachimura combines motion-capture data with digitized dance notation (specifically labanotation) to record motion related to traditional forms such as Noh and Kabuki theater.⁸¹ Three-dimensional animated motion-capture data have also been used to assist dancers learning choreography; such systems use motion-capture data to render 3-D images and streaming video to be combined with narrative description and dance notation. Even more recently, the National Endowment for the Humanities funded a project endeavoring to capture theatrical lighting designs using 3-D modeling and immersive displays of historical lighting that can then be experienced in a virtual-reality environment.⁸²

Regardless of the need for alternative archival practices, the essential tenets of performing arts archiving remain the same. Issues of appraisal, representation, preservation, outreach, and access all continue as pillars of archival theory and practice and provide fundamental guidelines for the tangible performance artifacts housed in archival repositories. However, archivists are increasingly involved in digital curation, digital humanities, and big data projects. The interdisciplinarity inherent in digital humanities projects like Virtual Vaudeville offers professional archivists an opportunity to revisit theory and practice around performance. Becoming conversant in technologies such as motion capture and working collaboratively with records creators to develop better tools, systems, and infrastructures that transmit cultural knowledge—while also preserving that knowledge in a way that is meaningful to historians, artists, and others who will ultimately use these records—presents an opportunity to begin establishing practices for records in continuous use. At the same time, it provides an opportunity for archivists to reframe performance archiving as a collaborative process that is adaptive and responsive to the needs of all stakeholders.

None of the existing technologies for capturing, preserving, and transmitting performance is perfect. Many technologies also represent distinctly Euro-American ways of thinking and understanding the world. The way anthropology currently frames the transmission of cultural knowledge requires one person or group of people to transmit information directly to another person or group. Motion capture and other new media technologies, on their own, do not solve

this capture/preservation problem, but combined with technologies that utilize information visualization as Virtual Vaudeville does, motion capture may offer the closest contemporary alternative to human-to-human transmission. Without diminishing the human factor, it is crucial to note again that Virtual Vaudeville, as a transmissive tool, functions effectively as both record and performance. The movements Contini made were captured along with attendant cultural information—gestures, facial expressions, audience responses, and so on—that the Virtual Vaudeville team members were able to convey. For cultural heritage to flourish in a digital environment, however, multiple considerations must be addressed simultaneously. Key among these are the human, social, technological, and information infrastructures—such as networks, systems, interfaces, and institutions—that allow heritage to thrive in any culture. If archives are to mitigate vagaries in the cultural record by utilizing digital tools and new media technologies, archivists must create the space needed for variable cultural forms and expressions to coexist within the same systems and for human and cultural differences to be celebrated within those systems. Finally, as they stop looking only to Euro-American systems and networks to think about documenting performance and other ephemeral cultural expressions, professional archivists will begin to see the unique ways that indigenous and other cultures represent ideas, solve problems, and create space for difference.

NOTES

- ¹ David Saltz, “A Live Performance Simulation System: Virtual Vaudeville: Project Summary” (grant proposal, National Science Foundation, 2001).
- ² David Saltz, “A Live Performance Simulation System: Virtual Vaudeville: Project Description: Objectives,” (National Science Foundation Grant Proposal, 2001), 2.
- ³ Jack Wolcott, “The Chestnut Street Theatre Project,” videocasions-nw.com/history/cst/cstabout.htm.
- ⁴ David Saltz, “A Live Performance Simulation System: Virtual Vaudeville: Project Description: Scholarly Implications” (National Science Foundation Grant Proposal, 2001), 2.
- ⁵ See Matthew Reason, “Archive or Memory? The Detritus of Live Performance,” *New Theatre Quarterly* 19, no. 1 (2003): 87.
- ⁶ Kenneth Schlesinger, Pamela Bloom, and Ann Ferguson, eds., *Performance Documentation and Preservation in an Online Environment* (New York: Theatre Library Association, 2004).
- ⁷ Sarah Jones, Daisy Abbott, and Seamus Ross, “Redefining the Performing Arts Archive,” *Archival Science* 9 (2009): 167.
- ⁸ See Tonia Sutherland, “Restaging the Record: Opportunities for Collaboration in Event-Based Archiving,” in *Annual Review of Cultural Heritage Informatics*, ed. Samantha K. Hastings (Lanham, Md: Rowman and Littlefield Publishing, 2015), 17–38.
- ⁹ See Jeannette Bastian, “‘Play Mas’: Carnival in the Archives and the Archives in Carnival: Records and Community Identity in the U.S. Virgin Islands,” *Archival Science* 9 (2009): 118. See also Michael K. Buckland, “What Is a Document?,” *Journal of the American Society for Information Science* 48, no. 9 (1997): 804–9.
- ¹⁰ Deborah Turner has written quite a bit on the concept of “oral documents.” See for example, Deborah Turner, “Can a Document Be Oral?,” *Proceedings of HICSS, 43rd Hawaii International Conference*

- on *System Sciences*, 2010, doi: 10.1109/HICSS.2010.91. See also Deborah Turner and Warren Allen, "Investigating Oral Information," *Information Research* 15 (September 2010), <http://InformationR.net/ir/15-3/colis7/colis703.html>.
- ¹¹ For more on the notion of "permanence" in archives, see James O'Toole, "On the Idea of Permanence," *The American Archivist* 52 (1989): 10–25.
- ¹² See for example Deborah Turner, "Conceptualizing Oral Documents," *Information Research* 12 (October 2007), <http://www.informationr.net/ir/12-4/colis/colis32.html>.
- ¹³ Saltz, "A Live Performance Simulation System."
- ¹⁴ David Saltz, "Virtual Vaudeville: A Digital Simulation of Virtual Theatre" (PowerPoint presentation, National Science Foundation, 2002). The Virtual Vaudeville Project Summary elaborates on this idea saying that the technologies and strategies developed through Virtual Vaudeville have applications that extend well beyond the simulation of theatrical performances; the same requirements and obstacles arise in the attempt to simulate any kind of performative event, including political congresses, coronations, parades, festivals, battles, rituals, riots, and so on.
- ¹⁵ David Saltz, "Scholarly Implications," 2.
- ¹⁶ See Matthew Arnold, "Culture and Anarchy: An Essay in Political and Social Criticism" (New York: McMillan, 1899), viii.
- ¹⁷ Virtual Vaudeville, "What Is Vaudeville?," <http://www.virtualvaudeville.com/hypermediaNotes/WhatsVaudevilleF.html>.
- ¹⁸ LeRoy Ashby, *With Amusement for All: A History of American Popular Culture Since 1830* (Lexington: University Press of Kentucky, 2006), 107.
- ¹⁹ Virtual Vaudeville, "What Is Vaudeville?"
- ²⁰ Frank Cullen, Florence Hackman, and Donald McNeilly, "Frank Bush, ca. 1860–1930," in Frank Cullen, *Vaudeville, Old and New: An Encyclopedia of Variety Performers in America*, vol. 1 (London: Routledge, 2007), 173.
- ²¹ Douglas Gilbert, *American Vaudeville: Its Life and Times* (New York: Dover Publications, Inc., 1940), 287–90.
- ²² Saltz, "Scholarly Implications," 2.
- ²³ David Nasaw, *Going Out: The Rise and Fall of Public Amusements* (New York: Basic Books, 1993). See also Saltz, "Scholarly Implications," 2.
- ²⁴ Virtual Vaudeville, "What Is Vaudeville?"
- ²⁵ Saltz, "Virtual Vaudeville: A Digital Simulation of Virtual Theatre."
- ²⁶ National Initiative for a Networked Cultural Heritage, "Building Blocks: Intellectual Needs Shaping Technical Solutions," <http://www.ninch.org/bb/project/project.html>. The Gladys Krieble Delmas Foundation "promotes the advancement and perpetuation of humanistic inquiry and artistic creativity by encouraging excellence in scholarship and in the performing arts, and by supporting research libraries and other institutions which transmit cultural heritage," <http://delmas.org/>.
- ²⁷ Dr. Susan Kattwinkel, interview with author, August 7, 2013.
- ²⁸ Dr. Bruce McConachie, interview with author, June 4, 2013.
- ²⁹ Dr. David Zucker Saltz, interview with author, August 19, 2013.
- ³⁰ Saltz, interview.
- ³¹ Saltz, interview. This change began in the 1980s with scholars like Bruce McConachie pushing for work on subjects such as melodrama.
- ³² Saltz, interview.
- ³³ Saltz, "Scholarly Implications," 3.
- ³⁴ NSF Project Manager, interview with author, July 17, 2013.
- ³⁵ NSF Project Manager, interview.
- ³⁶ NSF Project Manager, interview.
- ³⁷ NSF Project Manager, interview.
- ³⁸ Saltz, "Project Description," 1.
- ³⁹ McConachie, interview.

- ⁴⁰ McConachie, interview.
- ⁴¹ Saltz, interview.
- ⁴² Saltz, "Virtual Vaudeville: A Digital Simulation of Virtual Theatre."
- ⁴³ Saltz, "Virtual Vaudeville: A Digital Simulation of Virtual Theatre."
- ⁴⁴ Virtual Vaudeville, "Movie Gallery," http://www.virtualvaudeville.com/gall_movies.htm.
- ⁴⁵ Saltz, interview.
- ⁴⁶ Saltz, "Virtual Vaudeville: A Digital Simulation of Virtual Theatre."
- ⁴⁷ Saltz, "Virtual Vaudeville: A Digital Simulation of Virtual Theatre."
- ⁴⁸ Saltz, interview.
- ⁴⁹ Saltz, interview.
- ⁵⁰ McConachie, interview. The unnamed congressman made this statement in direct response to the question of whether a project employing blackface as an educational tool would be funded through the National Science Foundation.
- ⁵¹ NSF Project Manager, interview.
- ⁵² Saltz, interview.
- ⁵³ Saltz, interview.
- ⁵⁴ Kattwinkel, interview.
- ⁵⁵ Saltz, interview.
- ⁵⁶ Saltz, interview.
- ⁵⁷ NSF Project Manager, interview.
- ⁵⁸ Kattwinkel, interview.
- ⁵⁹ Saltz, "Virtual Vaudeville: A Digital Simulation of Virtual Theatre."
- ⁶⁰ Virtual Vaudeville, "What Is Vaudeville?"
- ⁶¹ Virtual Vaudeville, "The Union Square Theater," <http://vvaudeville.drama.uga.edu/learn.htm>.
- ⁶² Saltz, "Scholarly Implications," 3. These collections are housed at the Harry Ransom Humanities Research Center in Austin, Texas, and the Billy Rose Collection of the New York Public Library.
- ⁶³ McConachie, interview.
- ⁶⁴ Kattwinkel, interview.
- ⁶⁵ Saltz, "Scholarly Implications," 3.
- ⁶⁶ Kattwinkel, interview.
- ⁶⁷ NSF Project Manager, interview.
- ⁶⁸ Kattwinkel, interview.
- ⁶⁹ Kattwinkel, interview.
- ⁷⁰ Saltz, interview. As an addendum to this story, the researcher who located and purchased the Edison recording was so excited about it, he took it to class to share with his students. Within moments, it had flown out of his hands and shattered into hundreds of small pieces on the cement floor.
- ⁷¹ Kattwinkel, interview. Kattwinkel here is referring to an early photographic intervention. Historian Robert Taft, in his 1938 work, *Photography and the American Scene*, posits that the invention of photography and its subsequent technical refinements during the nineteenth century had a profound influence on the American theater. Photography, said Taft, was instrumental in the development of a "cult of celebrity" that had preoccupied the country by the year 1865. Many upper-class families considered it their duty to "have available in every parlor and sitting room a picture book of illustrious Americans." These illustrious Americans, due in part to the technological enhancements of Walter Benjamin's "mechanical reproductions," began to include stage performers; as such, people experienced theatrical photographs not only on personal levels, but on commercial and social levels as well. Promoters, managers, and performers put the manipulative power inherent in images to work as soon as it became economically viable and technologically possible. José Maria Mora, one of the leading theatrical photographers of the late 1870s, reported that in one year he sold more than 300,000 pictures of celebrities for a total of more than \$90,000. According to Henderson's *Broadway Ballyhoo!*, "Every large city had its shops

lined with bins of reproductions of familiar faces of presidents, politicians, orators, writers, and—especially—actors.” See Mary C. Henderson, *Broadway Ballyhoo! The American Theater Seen in Posters, Photographs, Magazines, Caricatures, and Programs* (New York: Harry Abrams, 1989), 49; and Robert Taft, *Photography and the American Scene: A Social History, 1839–1889* (New York: Macmillan Co., 1938), 316.

⁷² McConachie, interview.

⁷³ Kattwinkel, interview.

⁷⁴ Kattwinkel, interview. Kattwinkel goes on to say that “beyond that, I suppose it was just a matter of extrapolating to humanity. Cognitively, people were the same then as they are now. So modeling expressions and that kind of thing was pretty much, “Take the equivalent of that audience member today and what are they gonna do? What might they laugh at?” I think there was a lot of sort of just human nature involved in that. People haven’t changed. Society has, but people are essentially the same.”

⁷⁵ Saltz, “Virtual Vaudeville: A Digital Simulation of Virtual Theatre.”

⁷⁶ Kattwinkel, interview. For more on virtual reunification, see Ricardo L. Punzalan, “Understanding Virtual Reunification,” *The Library Quarterly* 84 (July 2014): 294–323.

⁷⁷ Saltz, interview.

⁷⁸ Saltz, interview.

⁷⁹ Saltz, interview.

⁸⁰ Geoffrey Rockwell, “Motion Capture and Noh,” *Theoreti.ca* (blog) <http://www.theoreti.ca/?p=4002>. I am grateful to Lindsay Mattock for this reference.

⁸¹ Dance notation can be compared to a musical score while motion-capture data is similar to a GPS system. Each movement is recorded in reference to a series of points on the body in space and represented as coordinates on a plane.

⁸² Adrienne LaFrance, “A Digital Time Capsule for Broadway Stage Lights,” March 25, 2016, <http://www.theatlantic.com/technology/archive/2016/03/theater-history/475293/>.

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