

MAKING HISTORY: APPLICATIONS OF DIGITIZATION
AND MATERIALIZATION PROJECTS
IN REPOSITORIES

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ABSTRACT

This project draws upon material culture, digital humanities, and archival theory and method in the service of public history investigations. After selecting an artifact and performing object analysis, I will digitize the artifact and materialize a new object. I will then perform another object analysis on the 3D printed object. This exercise will provide the familiar benefits of object analysis, but the decisions and interactions necessary to digitize and materialize the object provide a fresh perspective. I will propose approaches for performing similar investigations in repositories, along with a pedagogical argument for doing so. By emphasizing modularity, flexibility, and minimal capital requirements, I hope these approaches can be adapted to a variety of institutions and audiences. Researchers will reap the benefits of intellectual and emotional engagement, hands-on learning, and technological experimentation. Public historians will have the opportunity to engage in outreach and innovative education and exploration of their collections.

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CHAPTER 1

INTRODUCTION

The Shapeways package sat on a fencepost. It was too big to fit in the mailbox and hadn't made it to the porch because of the dogs. They're very loud and big for English Springer Spaniels, their presumptive (and undoubtedly nonexclusive) breed. Either or both dogs are more than enough to dissuade entry into the yard when they're outside. So the box sat on the fence for a little while, until I noticed that the dogs had been barking at a person in our yard, as opposed to a person walking a dog, or a car driving down the street, or invisible space monsters lurking in the trees.

Once aware of the box, I had a pretty good idea of its contents. I didn't have any outstanding orders from elsewhere and didn't think my husband did, either. So the box held the last item I needed to finish writing my highly attenuated thesis. Never mind that I still had some archival research to pursue. I could visit Haverford College any time. I am quite aware that archival records are not static—I process collections, and at Haverford would encounter evidence that collections are works in progress—but reading letters nonetheless seemed to be no more than a scheduling issue. Receiving a physical object seemed a more significant milestone. I had ordered not merely its delivery, but its creation.

So the box came inside and sat on the kitchen counter for a time. I was busy; I was nervous; I was uncertain what degree of ceremony was called for. I very much wanted a *good* object, but at the same time I knew the quality of the object was a secondary concern. It existed. That was enough.

I sliced the box's tape with a steak knife. It's an old knife, with a cheap black plastic handle. The rest of the set disappeared over the years. This one is only occasionally used at mealtime, but has instead become almost my default tool for opening boxes and removing tags. The scissors never seem to be where they're supposed to be, but the steak knife always makes it back into the silverware drawer.

The space within the box is almost entirely filled with packaging material. No packing peanuts, for which I am grateful: now that I am a grown up, responsible for picking up scattered bits of Styrofoam, I despise the things. Nor is it bubble wrap: a little more disappointing, because I am not sufficiently grown up to have lost my taste for popping the bubbles. Instead, a sheet of air cushions are wrapped around a white object, distorting my view of it.

I opted against complete documentation of the unboxing process, but I cannot resist taking a picture with my smartphone. (See Photograph 1.) Then I stab the air cushion—carefully, because I do not want to hurt my object, but nor can I resist the destructive impulse. It lacks the unmediated pleasure of popping bubble wrap, the feel of a finger nestling comfortably into the depression left behind by displaced air, but it will do. And deflating the cushions does have a practical effect: the deflated cushions will take up less space in the recycling.

A cardboard box. A steak knife. Packing material. A yard with a fence and domesticated animals. The economic and technological systems that allow me to supply a digital file to a company in New York and receive a printed object in a matter of days. These are material markers of my life, revealing despite—or perhaps because—they are

so routine as to be invisible. A similarly routine object was my point of entry into an earlier era, and the reason for the new object's existence.

Knifework finished for the moment, I unwound the plastic and began shaping my final chapter.



Photograph 1. 3D printed object wrapped in air cushions for shipping.

Small Things Not To Be Forgotten

I approach this project from the perspective of an archivist—more specifically, an archivist who views her professional duties as public history, and more broadly identifies as a historian. This is by no means a universal conception of the profession, but it infuses the way I perceive institutions, interact with historical sources, and interpret collections.

“Archives” is a contested term. The Society of American Archivists offers a professional definition.¹ Scholars in various fields deploy the term and also debate its

implications. Professionals in different fields use the term. The broader public has an understanding of the term that need not rise to the level of term of art, but still has meaning. These competing understandings can never be fully resolved—which is not a bad thing, as continued debate reflects the underlying relevance of archives—but they do serve to illuminate the conceptions, desires, and needs of the individuals who create archives and those who use them.

In less formal contexts, academics and professionals actively discuss the meaning of archives—both the word and the material to which it refers. The use of Twitter at conferences offers a glimpse into these conversations, as well as the opportunity to expand them beyond the attendees. One observation about the nature of archives—“Just want to remind everybody that the Beinecke holds Carl Van Vechten’s porcelain cat collection”—bears the hashtag of a data-related session at the Modern Language Association’s 2014 convention.² Following discussions at academic conferences—or professional conferences more directly related to the field of archives—yields similar pithy statements but also links to more substantive articles and bibliographies.³ The conversations—or perhaps conversation, given the ease with which questions and responses can cross disciplines (some of which are interdisciplinary by nature)—reveals a strong interest in grappling with the meaning of archives.

Writing from the perspective of an archivist, Kate Theimer concisely engages with the the use of the term “archives” in the digital humanities. She concedes that the archival profession does not own the term, and that in different contexts alternate definitions may be useful. In IT, archives are backed up data; on the Web, archives are non-current material; in the digital humanities, an archive is “a purposeful collection of

surrogates.” Theimer argues that the traditional definition of archives is more specific, and that there is value to be derived from that specificity, the contextual information imparted by a collection as a whole, and the weight of professional practice.⁴

Archivists routinely work with a variety of materials. Unbound words-on-paper may leap to mind as the primary, most common, and most venerable of archived material, but archives also hold graphical, audio, video, bound volumes, born-digital, and digitized material. Theimer points out that formal definitions of archives are inclusive and require no expansion to incorporate digital materials.⁵ Schellenberg’s writings emerged from the mechanically-enabled avalanche of paper documents filling government archives, but his definition of “record” was agnostic as to format.⁶ If a photograph is as much a record as a memo, why not a porcelain cat?

Yet archives often give short shrift to material culture, despite the inclusiveness of archival theory. Jim Burant argues that ephemera should be treated in the same way as more traditional documents. The materials to which he refers are transitory, often printed text: tickets, advertisements, postcards. Vibrant personal collections and markets for such material attest to public interest. He details archivists’ lack of attention to ephemera in literature, its haphazard acquisition, and inadequate intellectual control.⁷ Inclusion of this article in my review of the literature, rather than one of more recent vintage, speaks to the way in which this type of material remains sidelined. The problem can be worse for non-textual artifacts, which may also present challenges to physical control.

Burant’s postcards can fit in a Hollinger box. Other materials require additional care, different housing, or creative description. Henry Muhlenberg pressed plant samples in some of his botanical notebooks. Though secure between the pages for over two

centuries, a conservator's care and rehousing is advisable, and in this case separating the materials might increase their visibility. A reader of *Monographia plantarum Lancastriensis* may well have more interest in botanical descriptions and local names, but the presence of samples could speak to Muhlenberg's priorities or process.⁸ Textual Haines family ephemera—including newspaper clippings and postcards—remain foldered with the collection, but an apron pocket and war victims' badge were separated.⁹ The Friends Historical Library holds such artifacts as a spinning jenny, bonnets, and hat boxes, but as they are not the primary focus of the Library, their description is least detailed.¹⁰ High profile, frequently accessed collections are likely to be most carefully processed, with finding aids most readily available online. Researchers may be delighted to stumble upon rogue pieces of material culture, but may not even know to ask whether they are available. Such oddities can lapse into invisibility.

This is a problem because material culture is culture. Furthermore, it is a form of culture that can document the lives of non-elite members of society, as James Deetz notably illustrated with *In Small Things Forgotten*.¹¹ One of the most cutting critiques of archives is the tendency to reinforce existing power structures. Members of the profession are aware of this, and the potential to distort the historical record and enable unjust treatment of individuals and groups. Strategies suggested for combating the problem include the implementation of collection policies targeting underrepresented groups.¹² By paying more attention to material culture—the non-textual artifacts that could be collected, or may already exist within collections—archivists can help give a voice to the traditionally marginalized and build a more complete and useful historical record.

Methodology and Situation

I have drawn on the work of academics in various disciplines—not simply history—including American studies, history of art, cultural and information studies. In modeling a course of study and then applying it to a specific artifact, I follow Fleming.¹³ By emphasizing a modular approach to inquiry and the re-evaluation of an artifact, I follow Schlereth.¹⁴ My object analysis methodology largely follows Prown.¹⁵ The archival theory which informs my writing is professional in nature, as well as theoretical. My pedagogical argument touches upon information studies, behavioral economics, psychology, and the digital humanities, as well as the practical experience of individuals working in the field.

I have embraced an interdisciplinary approach. Historians open to the practices and findings of other disciplines can access a wealth of information about the past. Public history is fundamentally an interdisciplinary and collaborative endeavor. Archival theory and practice draw from related disciplines, particularly library science, information technology, and museum studies. Digital humanities is a dynamic endeavor (albeit ill-defined, in many traditional senses) that offers the tools to approach existing sources in a new way.

Advancing digitization and materialization as a digital humanities project is at once obvious and disruptive. The “spatial turn” emphasizes mapping and other visual representations of data. Elliott et al warn that computational text analysis may reinforce historians’ textual bias. This project, like Elliott’s exploration of the material culture of stage magic and the history of the senses, casts material culture and public history within

the digital humanities.¹⁶ It also drags archives under the same umbrella. Archival literature is concerned with all manner of things digital—data migration, bit preservation, born-digital records, authentication, digitization—but largely ignores subsequent materialization, to say nothing of the three-dimensional artifacts that have found their way into collections.

Making replicas of artifacts is nothing new. There is a long history of their display within repositories and sale as souvenirs. Plaster casts and photocopies have been replaced by 3D models and .jpgs. Printing those 3D models is not so different than printing the .jpgs: the utility of the practice is determined by the end goal and available technology.

I wish to focus upon the benefits of digitization and materialization projects within small institutions. I will not examine large institutions. Comparatively well-endowed and -staffed, with high profile collections capable of attracting the attention of partners and grant-givers, they are in a good position to engage in large-scale digitization projects. Such institutions have space in their budget for project staff and capital investments. The Smithsonian, for instance, has identified 10% of its holdings as priorities for digitization.¹⁷ While exciting, that sort of initiative is not immediately relevant to the daily operations of a repository with a tiny staff and a paper-based catalog. Small institutions rely upon a core of dedicated staff members and the contributions of local communities and other stakeholders. The nature of the mission and collections of smaller institutions often means professional lines are blurred at an individual, not merely institutional, level. The smaller the institution—whether dubbed “archive,” “library,” or “museum”—the more likely staff must be flexible and cross-trained. And while the staff

is also more likely to be overworked and under budgetary pressure, a 3D modeling project can be undertaken cheaply and accomplish such fundamental goals as community outreach and education.

In Chapter 2, I will discuss the pedagogical and emotional value of physical interaction with objects. I will also discuss disciplines and rubrics, particularly as they apply to the work of public historians, and define several publics that can participate in the digitization and materialization projects I describe.

In Chapter 3, I will propose strategies for bringing the public into repositories to encounter and interact with artifacts—and technology—in unexpected ways. I have adopted modular approaches which may be used individually or in combination to more thoroughly interrogate an object.

In Chapter 4, I will employ object analysis methodology to investigate a particular object. My engagement with the physical object will be supplemented by historical research, and the choice of object provides an opening to explore such topics as gender roles, the significance of toys and childhood play, and the nature of housework.

In Chapter 5, I will discuss the technical process of digitizing and materializing the artifact. As human interaction with technology is an important part of my analysis, this chapter takes the form of a reflexive project narrative.

In Chapter 6, I return to object analysis, this time analyzing the plastic printed object. My involvement in the creation of the object underlines the subjectivity of the enterprise.

¹ For reference, the SAA uses the following definition of “archive(s)”: “n. ~ 1. Materials created or received by a person, family, or organization, public or private, in the conduct of their affairs and preserved because of the enduring value contained in the information they contain or as evidence of the functions and responsibilities of their creator, especially those materials maintained using the principles of

provenance, original order, and collective control; permanent records. – 2. The division within an organization responsible for maintaining the organization’s records of enduring value. – 3. An organization that collects the records of individuals, families, or other organizations; a collecting archives. – 4. The professional discipline of administering such collections and organizations. – 5. The building (or portion thereof) housing archival collections. – 6. A published collection of scholarly papers, especially as a periodical.” Richard Pearce-Moses, *A Glossary of Archival and Records Terminology* (Chicago: Society of American Archivists, 2005), PDF Edition, 30.

² Natalia Cecire, Twitter, 10 January 2014, 11:17 A.M.
<https://twitter.com/ncecire/status/421722404700684288> (accessed 11 January 2014).

³ See for example Alan Liu, Twitter, 10 January 2014, 12:08 P.M.,
<https://twitter.com/alanyliu/status/421735440014512128> (accessed 11 January 2014) and Bergis Jules, Twitter, 15 August 2014, 8:44 A.M., <https://twitter.com/BergisJules/status/500306931375161345> (accessed 5 September 2014).

⁴ Kate Theimer, “Archives in Context and as Context,” *Journal of Digital Humanities* Vol. 1, No. 2 (Spring 2012), <http://journalofdigitalhumanities.org/1-2/archives-in-context-and-as-context-by-kate-theimer/> (accessed 29 March 2013). For “a purposeful collection of surrogates,” Theimer quotes Kenneth M. Price, “Edition, Project, Database, Archive, Thematic Research Collection: What’s in a Name?” *Digital Humanities Quarterly* Vol. 3, No. 3 (2009), <http://www.digitalhumanities.org/dhq/vol/3/3/000053/000053.html> (accessed 29 March 2013).

⁵ Theimer, “Archives in Context.” Theimer would probably also point out that the Beinecke Rare Book and Manuscript Library is not a true archives; her proposal that digital humanists’ perception of archives is influenced by their use of manuscript and special collections seems reasonable.

⁶ T. R. Schellenberg, *Modern Archives: Principles and Techniques*, (Chicago: The Society of American Archivists, 1956) HathiTrust Edition, 25 November 2013, 15-16.

⁷ Jim Burant, “Ephemera, Archives, and Another View of History,” *Archivaria* 40 (January 1995), <http://journals.sfu.ca/archivar/index.php/archivaria/article/view/12105/13098> (accessed 6 December 2012), 190-193, 195-197.

⁸ I encountered Muhlenberg’s botanical samples in 2011 during processing of materials accessioned over time and incorporated into the American Philosophical Society’s Muhlenberg Family Papers, Mss.B.M891.

⁹ The Haines material, Coll. No. 950, has been worked on in recent months, so its arrangement may be considered in flux. In addition to more standard reference service, curator Sarah Horowitz was kind enough to talk about some of the behind-the-scenes work when I visited Haverford Special Collections for research.

¹⁰ Information about the FHL’s collection, policies, and practice courtesy of a 2010 conversation with curator Christopher Densmore, undertaken to write a site visit report for a graduate course.

¹¹ James Deetz, *In Small Things Forgotten: An Archaeology of Early American Life* (New York: Anchor Books, 1996).

¹² See Randall C. Jimerson, “Archives for All: Professional Responsibility and Social Justice,” *The American Archivist* Vol. 70, No. 2 (Fall/Winter 2007): 252-281, <http://archivists.metapress.com/content/5n20760751v643m7/fulltext.pdf> (accessed 14 July 2014) for an example of activism within the profession and 266-269 specifically for a discussion of collection diversity.

¹³ E. McClung Fleming, “Artifact Study: A Proposed Model,” *Winterthur Portfolio* Vol. 9 (1974): 153-173, <http://www.jstor.org/stable/1180572> (accessed 23 August 2012).

¹⁴ Thomas J. Schlereth, "Historic House Museums: Seven Teaching Strategies," in *Artifacts and the American Past*, 91-119 (Nashville, Tenn.: American Association for State and Local History, 1980).

¹⁵ Jules David Prown, "Mind in Matter: An Introduction to Material Culture Theory and Method," *Winterthur Portfolio* Vol. 17, No. 1 (Spring 1982): 1-19. <http://www.jstor.org/stable/1180761> (accessed 23 August 2012).

¹⁶ For more on the work being done at Western University, see especially Devon Elliott, Robert MacDougall, and William J. Turkel, "New Old Things: Fabrication, Physical Computing, and Experiment in History Practice," *Canadian Journal of Communication* Vol. 37 (2012), PDF provided by the co-author 7 December 2012, 122 for the warning about textual bias, 123-124, 127; William J. Turkel and Devon Elliott, "Making and Playing with Models: Using Rapid Prototyping to Explore the History and Technology of Stage Magic," 10 March 2011 draft, forthcoming in a volume edited by Kevin Kee, PDF supplied by the co-author, 7 December 2012.

¹⁷ Günter Waibel, "About Smithsonian X 3D," Smithsonian X 3D Web site, <http://3d.si.edu/about> (accessed 14 July 2014).

CHAPTER 2

CRITICAL MAKING

In this chapter, I will discuss the pedagogical and emotional value of physical interaction with objects. Critical making provides a framework for hands-on experimentation in an educational setting, but the value is not limited to the formal classroom environment or traditional course structure. The IKEA effect is a term describing individuals' investment in objects which they have personally constructed. Taken together, these two concepts illuminate ways in which students can learn about artifacts and a mechanism by which they may be motivated to care about doing so.

I will also devote some space to the question of disciplines and rubrics. Public history is, fundamentally, interdisciplinary in nature.¹ Archival education and practice in particular embrace many influences. The dual STEM/historical nature of a digitization and materialization project—or digital humanities projects in general—are not unfamiliar to repositories. The creation of rubrics allows work by students, academics, independent scholars, and professionals to be critiqued and legitimated. Examination of my modest digitization and materialization project provides the opportunity to consider the way these issues impact public history theory and practice.

The remainder of my discussion is devoted to defining publics. Projects involving digitization and materialization can target a variety of publics: children, high school students, college students, makers, and public historians are all discussed. The strategies I outline focus primarily upon public historians and college students. They assume a

certain comfort level with the process of research and material culture methodology. But it is worthwhile to note ways in which other publics might be invited to participate.

Critical Making and the IKEA Effect

Matt Ratto makes a case for the power of individual engagement in the activity of making. The pedagogical framework of constructionism, commonly found in STEM fields, can also be applied to social sciences and humanities. Participants who both understand the connection between concepts and objects, and who have a personal investment in the object being made, become critically engaged with their material.² The learning experience becomes more collaborative and subjective.

The more effort expended, the more the result is valued. Researchers concerned with consumer behavior and psychology have quantified this “effort justification” through experiments in which objects were assembled and then valued by their builders and prospective customers. Whether assembling IKEA boxes or folding origami animals, creators consistently valued their works more highly than did others.³ Additional experiments revealed that completion is a vital component of what is dubbed the IKEA effect. Lego sets which were prebuilt or built and then unbuilt were valued less highly than sets which participants built, and IKEA boxes that were only partially assembled were valued less highly than fully-assembled boxes.⁴ Mere ownership or contact is insufficient to increase value.⁵ This fact should be remembered when devising making projects. Students should have an attainable goal and tangible end product to take advantage of the IKEA effect.

Public historians are familiar with the importance of emotional hooks and material objects. *The Presence of the Past* continually emphasizes the ways in which personal stories and physical objects encourage public engagement with the past; the narrative construction Tilden advocates in *Interpreting Our Heritage* relies upon the physical backdrop of a park as well as a reading of audience interest; the history of the George Washington Birthplace National Monument when read as a contest of relics.⁶ Ratto's critical making scenarios do not involve the use of pre-existing artifacts, but suggest that creating one's own object can be at least as effective as using period artifacts.

The pedagogical implications of critical making and the IKEA effect are relevant to archivists and other employees of cultural institutions. Ratto's concerns are geared toward educational institutions—he is an academic and references the intellectual and physical geography of the university campus.⁷ However, archives have an educational responsibility, even though it is not their sole mission. Such routine tasks as conducting reference interviews, writing finding aids, and engaging in public outreach may be viewed in this light. Ratto's case studies involved projects undertaken at conferences and colloquia.⁸ Critical making experiments need not involve the expenditure of resources necessary for a semester long academic course. They could be adapted for the outreach opportunities already available to archivists. Norton and his co-authors view personal engagement in the context of consumer behavior, marketing, and employee motivation.⁹ Though cultural institutions are not typically run with an eye toward increasing profits, there is a service component to reference and outreach functions. Strategies for attracting and interacting with paying customers may be adapted for the non-profit realm. Public

historians straddle the scholarly, professional, and popular realms, and should make use of a similarly wide range of tools.

Multidisciplinarity in the Archives

The pedagogical goal of bridging gaps between disciplines should resonate for public historians. Ratto's concern is not merely bringing together the "hard" STEM fields and the "soft" social sciences and humanities. He is well aware of the divides that exist within those softer fields.¹⁰ Others conceive of experimentation as a tactic outside of STEM disciplines: for example, Devon Elliott stresses the importance of experimentation and model building to explore the history of the senses.¹¹

This examination of the implications of multidisciplinary complication and cross-pollination is relevant for the archival profession. Formal archival education programs may be housed within history, library science, or IT departments. The Association of Canadian Archivists's 1990 guidelines for a Master's of Archival Studies emphasize the benefit of diverse educational backgrounds; they highlight the advantages of affiliating archives and library programs with information science, but also acknowledge the potential of siting programs within history or law departments.¹² The Society of American Archivists advocates 18 credit hours of "core archival knowledge" at the graduate level and acknowledges the many fields (including history, information studies, law, economics, technology, and management) that can provide valuable supplementary knowledge.¹³ The program-agnostic approach doubtless has a practical element, a concession to the existing structure of academic programs and lack of organizational clout. But the repeated references to the manner in which a core archival curriculum

intersects with other disciplines suggests that a multidisciplinary approach is (and should be) viewed as a feature, not a bug.

Two individuals with the job title “archivist” and equivalent certification may thus have fundamentally different approaches to their work, and individuals with superficially similar roles as information professionals may in fact have significantly (if subtly, at least to outsiders) different professional priorities. Eun G. Park’s 1998 survey documented the diverging language and priorities of archivists, records managers, and librarians.¹⁴ Kathryn A. Scanlan outlines the professional friction between archivists and records managers—two groups who, based on Park’s survey, are at least linguistically similar.¹⁵ Terry Cook conceives of increasingly close bonds between archivists and records managers, information technologists, librarians, and museum curators, with the traditional bond between historians and archivists becoming weaker. He highlights the subjectivity of the selection process (often ignored by historians), the privileging of a record’s content rather than context, and practices which marginalize archives.¹⁶ One can imagine that a historian with formal archival training might have a greater appreciation than others in her cohort for the less-than-objective (and often alarmingly haphazard) means by which records enter the archives, and an archivist with training as a historian would be more sensitive to historians’ professional assumptions than his colleague with a background in IT. Diverse professional backgrounds can be a repository’s strength, allowing staff to synthesize theoretical and practical advances in a variety of fields to the benefit of the collection and its users.

Rubrics in the Classroom and Wider Ecosystem

No discussion of pedagogy or intellectual work is complete without touching upon rubrics. Ruth Mostern's roles as creator and grader of digital works forced her to confront the manner in which such works are assessed by tenure committees, classroom instructors, and the academic community in general. Drawing parallels to analog works can offer a useful guideline. A digital work that is similar to a book should be declared complete at a distinct point, after which it enters the academic ecosystem. A digital work that is analogous to a library should be considered constantly in flux as its virtual collection expands.¹⁷ Mostern's calls for peer review of digital works are reminiscent of Thomas Schlereth's calls for peer review of museum exhibits. The difficulties which Schlereth cited—the challenges of assigning responsibility for collaborative works and the ephemeral nature of the product—can also apply to digital works.¹⁸ Identifying a genre which requires rubrics and mapping its similarities and divergence from other genres, is a necessary step in legitimizing the value of scholarly work in non-traditional (or traditionally overlooked) forms.

Ideally, museum exhibits can be photographed or otherwise recorded, and digital works need not be ephemeral. In fact, digital works may serve as a means of preserving physical exhibits of limited duration—though in this respect, digital works are best viewed as archives or records of the exhibits and not fully representative of the original work.¹⁹ Digital works may remain available indefinitely, or grow in scope over time. But the potential volatility of digital resources cannot be ignored in the face of changing technologies, limited infrastructure, and varying degrees of personal or institutional support. If the longevity of the product—digital work or museum exhibit—is in question,

then timely and systematic peer review is an even more important tool for drawing the work into scholarly conversations.

Identifying Publics

A digitization and materialization project could be tailored for different publics. The parameters of the projects, and the rubrics for evaluating its success, would shift based upon the group chosen. Students in elementary school, high school, or college could embark upon such a project in conjunction with their regular classwork. Self-identified “makers” may find such a project interesting, either as independent researchers or participants actively solicited in the course of the repository’s outreach efforts. Public historians are also a public: we should not overlook new opportunities to examine our collections.

The strategies I outline focus primarily upon public historians and college students. They assume a certain comfort level with the process of research and material culture methodology. But it is worthwhile to note ways in which other publics might be invited to participate.

Children and High School Students

Angela Hegadorn, a children’s librarian in the Delaware County Library System, articulated some of the difficulties designing community events for a younger audience. Tight age-targeting allows the designer to tailor the program to the audience. An “all ages” program encourages broad participation, but runs the risk of boring older children and being beyond the physical and intellectual capabilities of younger children. However,

in a mixed-age group older children will help the younger ones; the participating children all have an educational experience, even if it is not the *same* educational experience.²⁰

Shawn Beckett, a high school history teacher in the school district of Philadelphia, offered advice for implementing making projects at the high school level. He advised against a field trip in which the entire class visited a repository to conduct research and hands-on work with artifacts. There would be a good chance of at least one or two students finding disruption more entertaining than participation. The logistics of dealing with troublemakers could sap attention from the other students. Beckett proposed two alternatives: offering the project as an opt-in enrichment opportunity, or limiting participation to the potential troublemakers. Soliciting volunteers would guarantee a certain amount of enthusiasm from each participant. Targeting the troublemakers would place them in a smaller group, minimize the entertainment value of causing disruptions, and confer the benefits of more individualized attention. These students might also be the ones most likely to benefit from hands-on learning.²¹

The teacher's first obligation is to the students. The public historian's is, in a complicated fashion, to the collection. Its physical safety must be safeguarded, and the condition of some materials may necessitate limited handling. But access is still important. No matter how well-preserved, -secured, and -described, the most impressive collection in the world is ultimately pointless if no one ever uses it. Balancing the responsibility to the collection's physical well-being with the needs of users is a perennial concern.

Students who voluntarily participate in this sort of project may be assumed to be trustworthy researchers, but the teacher's assessment of the students' probable behavior

should be actively solicited. No familiarity with primary source research should be assumed, and they should all be informed of repository policies in advance.²² They should also be informed of the rationale behind those policies. Rules such as “pencils only,” “no flash photography,” and so forth may seem arbitrary, but explanations may not only make students more mindful but also encourage thinking about the materiality of the collection. A dose of humor, and signals that professionals can laugh at themselves, could make the experience feel less pedantic and may even spur interest in the field of public history.²³ When designing such a program, the public historian may choose to guide students to less fragile materials.

In that respect, my chosen artifact—a metal meat grinder—is a good choice. Mishandling (inadvertent or intentional) is unlikely to result in damage to the meat grinder. Its very solidity might encourage interaction and more detailed object analysis. Some students might be inclined toward tentative interaction with historical artifacts, particularly after having been briefed on repository protocols. Encountering a decidedly non-fragile artifact could provide reassurance and encouragement. In a hands-on project such as this, convincing students that they can and should physically interact with artifacts is itself an educational goal.

College Students

A project of this nature offers the opportunity for a repository to partner with a local college or university.²⁴ In the formal context of a particular class, the students will have a set schedule and assignments. The course in general, and project in specific, will receive a grade.

Selecting an endpoint for the project is an important part of developing a grading rubric. Is the goal the production of a 3D model? A printed object? Twenty pages examining an artifact's history and material attributes? All of these are easily-defined endpoints with clear deliverables that can be evaluated. (Is the model printable? Does the printed version replicate the original in the ways intended? Does the paper demonstrate engagement with primary and secondary sources?) They are analogous to books, in Mostern's approach to rubrics: completed academic work products ripe for critique. Broader goals—gaining proficiency with digital tools, fostering a positive (and potentially ongoing) relationship with the repository—are less clear. They are embedded in such a project, but do not easily lend themselves to the percent-of-grade-based-on breakout that is a ubiquitous, if not universal, section of the syllabus. Potential benefits beyond the end of a semester—such as the creation of a virtual collection of artifacts which grows over time—may be a goal for the professor and repository, but will not come to fruition during the period when students must be evaluated. Projects associated with a discrete course should have an easily-identifiable endpoint.

Makers

The self-identified maker community is another potential public. Or, rather, publics: the term “maker,” like “pornography,” relies on “you’ll know it when you see it,” and is less specific than the other publics I have identified. The specific background, interest, age, experience, and requirements of makers will be highly variable. Some may have expertise with 3D printing. Some makers may have a native interest in historical inquiry, or may even have discovered their interest in making via history. But the

material culture angle of materialization projects should appeal to a broader cross-section of the maker public.

While individuals may approach repositories and can be served as regular researchers, repositories may also wish to engage in outreach activities. Publicizing the repository's holdings on mailing lists and other maker-focused forums can increase awareness of local historical resources. Digitization and materialization projects may be suitable proposals for hackathons. As in the younger student groups, familiarity with theory, research practices, and repository guidelines cannot be assumed—but given the voluntary nature of makers' involvement, interest and enthusiasm can.

I surveyed Kickstarter projects in order to get a sense of how 3D printing is used and envisioned among backers.²⁵ Kickstarter campaigns involve the cultivation of communities, the development of a compelling narrative, and setting realistic goals.²⁶ To a very limited extent, those qualities allow me to use Kickstarter backers as a stand-in for the fuzzily-defined “maker” public, and consider how that interested and motivated public might approach questions of material culture as well as technology.

The survey of Kickstarter projects suggests that the audience with the interest in (and means to) support projects related to 3D printing cares about devices—printers and pens—that can print objects. Project backers do not particularly care about 3D printed objects—they care about 3D printing *their own* objects. Creative projects are most rewarded when they provide others with the tools to be creative.

This propensity for personal, hands-on use is not particularly surprising. Read alongside discussions of critical making and the IKEA effect, it suggests an interest in process rather than outcome.²⁷ It is, perhaps, somewhat ironic to propose a material

culture project in which the actual object is somewhat irrelevant. But material culture is about human interaction with the material world, the encounter between the human and the object. It is the intellectual stimulation of that encounter which is important for my purpose, not the nature of the object which serves as a catalyst.

Public Historians

The final public is one I broadly term “public historians” but could easily be dubbed “information professionals” or “knowledge workers.” I use the term as shorthand for the archivists, curators, librarians, and other professionals who work in repositories. In some ways this is a counter-intuitive definition. The “historian” aspect often derives from the place of employment rather than formal training, and it does not address the practice of public history outside cultural institutions. Nonetheless, I am inclined toward this interdisciplinary and functional definition, as may be inferred by the nature of my studies, professional activities, and this project: I study American history, specifically public history, with a concentration in archives; I work as a processing archivist in the manuscripts department of a research library; I have selected an artifact in a museum as the focus of my thesis. Nor should the impact of cross-training be ignored: many repository employees hold graduate degrees in more than one field, offering them formal training in different methodologies and further muddying the practical distinctions between disciplines.

Strict definitions of institutional activities are often elusive. The second edition of *Describing Archives: A Content Standard* specifically references the “growing convergence” between museum, library, and archival practice.²⁸ Peter Hirtle predicted

and encouraged special collection librarians' emulation of archivists and museologists, emphasizing their manuscript and archival holdings, and treating their collections as museums.²⁹ Local examples illustrate the porous nature of institutional identity. The Friends Historical Library documents the history of Quakers, but also houses the archives of Swarthmore College, where the Library is physically located. The American Philosophical Society has a Museum and a Library, which includes organizational archives and manuscripts as well as bound volumes; the Library also creates exhibits to highlight particular objects in the collection, independent of the Museum exhibits across the street. The Germantown Historical Society likewise includes a museum, library, and archives, and has recently merged with Historic Germantown and its component historical attractions. One of those institutions, the Wyck Association, operates a house museum as well as a garden and farm, and the Association's papers are housed at the American Philosophical Society. I prefer to simply acknowledge the cross-over nature of the organizations, their functions, and their staff; assert the value of allied fields (such as archival and library sciences) remaining in active dialog; and view the occasionally strained, forced interdisciplinary results as an opportunity.

These individuals are responsible for the care of artifacts and facilitating access. But intellectual engagement is also important. On the most basic level, intellectual control of a collection enables and informs other functions: selection, description, preservation, access. Increased engagement with the collection, intellectual and hands-on, serves to make public historians more expert. They are in a better position to properly care for their collection and direct users to the material they need.

Public historians are not passive actors, even if their roles are sometimes transparent to outsiders. Cook notes that, outside the field of archives, attention to the subjectivity of sources rarely extends beyond the records themselves to the process by which they were selected.³⁰ The broader public is generally unaware of the actual work performed. I have been asked “What’s an archivist?” when filling out forms with a space for job title, and my work with material of recent vintage has been greeted with surprise that archives contain more than “old” things. News stories about archives either call them dusty or make a point of saying they are *not* dusty.³¹ Stock images of women shushing patrons and the recent interest in librarians’ tattoos likewise serve as a testament to professional stereotypes and a desire to challenge them.³² Archivists may work exclusively with born-digital objects untroubled by dust, curators may focus on interactive exhibits rather than objects, and librarians may program and run makerspaces.³³ Publicizing these activities may help change public perceptions of the professions. On a practical level, this may eventually lead to tangible benefits, such as increased funding. But a more nebulous goal may also be accomplished. By revealing the scope of the work performed by such professionals, their publics may acquire an increased appreciation for the contested nature of historical knowledge.

¹ Denise Meringolo, “What is Public History?” in *UMBC UGC New Course Request: HIST 300 Introduction to Public History*, 2, <http://www.umbc.edu/ugc/2010-2011%20Courses/HIST300.pdf> (accessed 13 December 2011) identifies four pillars of public history: scholarship, public services, collaboration, and immediacy. An undertaking with such goals is necessarily interdisciplinary. Collaboration implies varied areas of expertise, and the skills required to straddle scholarship and outreach cross disciplinary lines.

² Matt Ratto, “Critical Making: Conceptual and Material Studies in Technology and Social Life,” *The Information Society* Vol. 27, No. 4 (2011), 254-255, DOI: 10.1080/01972243.2011.583819 (accessed 23 September 2012).

³ Michael I. Norton, Daniel Mochon, and Dan Ariely, “The IKEA effect: When labor leads to love,” *Journal of Consumer Psychology* 22 (2012), 454-457, DOI: 10.1016/j.jcps.2011.08.002 (accessed 27 February 2013).

⁴ Norton et al, 457-458.

⁵ Norton et al, 459.

⁶ Roy Rosenzweig and David Thelen, *The Presence of the Past: Popular Uses of History in American Life* (New York: Columbia University Press, 1998); Freeman Tilden, *Interpreting Our Heritage* (Chapel Hill, N.C.: The University of North Carolina Press, 2008); Seth C. Bruggeman, *Here, George Washington Was Born* (Athens, Ga.: The University of Georgia Press, 2008), chapter 4.

⁷ Ratto, 258.

⁸ Ratto, 254-5.

⁹ Norton et al, 459.

¹⁰ Ratto, 259.

¹¹ Devon Elliott, Robert MacDougall, and William J. Turkel, "New Old Things: Fabrication, Physical Computing, and Experiment in History Practice," *Canadian Journal of Communication* Vol. 37 (2012), 123, PDF provided by the co-author 7 December 2012.

¹² Though the ACA guidelines are tailored for the Canadian context, I agree with their references to the "marked international character" of the archival literature and community and thus the relevance of international writing to my discussion. Association of Canadian Archivists, "Guidelines for the development of a two-year curriculum for a Master of Archival Studies," 1990, 9, 13-14, http://archivists.ca/sites/default/files/Attachments/Communications_attachments/misc/guidelines_mas_web.pdf (accessed 23 December 2012).

¹³ Society of American Archivists, "Curriculum," Guidelines for a Graduate Program in Archival Studies, Society of American Archivists Web site, <http://www2.archivists.org/gpas/curriculum> (accessed 23 December 2012).

¹⁴ Eun G. Park, "Understanding "Authenticity" in Records and Information Management: Analyzing Practitioner Constructs," *The American Archivist* Vol. 64, No. 2 (Fall/Winter 2001), 271, 284-6, <http://www.jstor.org/stable/40294173> (accessed 16 October 2011). Some of the divergence is doubtless due to professional responsibility—Park surveyed practicing archivists, records managers, and librarians, without reference to the specific circumstances of their education. But the assumptions displayed still indicate a theoretical divide which may be at least partially attributed to training.

¹⁵ Kathryn A. Scanlan, "ARMA v. SAA: The History and Heart of Professional Friction," *The American Archivist* Vol. 74, No. 2 (Fall/Winter 2011): 428-450, <http://archivists.metapress.com.libproxy.temple.edu/content/b52104n3n14h8654/fulltext.pdf> (accessed 23 December 2012).

¹⁶ Terry Cook, "The Archive(s) Is a Foreign Country: Historians, Archivists, and the Changing Archival Landscape," *The Canadian Historical Review* Vol. 90, No. 3 (September 2009), 499, 514, 517, 518, DOI: 10.3138/chr.90.3.497 (accessed 8 November 2011).

¹⁷ Ruth Mostern, "Student-Authored Digital Atlases and Digital Humanities Genres" and panel Q&A, Penn Digital Humanities Forum: Mapping Cultural History, Visualizing Cultural Information, Philadelphia, PA, March 29, 2013, http://humanities.sas.upenn.edu/footage/12-13/dhf_mar29.shtml and "Teaching Silk Road History with Google Earth," UC Merced Center for Research on Teaching Excellence, <http://crte.ucmerced.edu/mostern> (accessed 1 April 2013). Mostern collaborated in the creation of the Digital Gazetteer of the Song Dynasty and discussed grading digital atlases.

¹⁸ Thomas J. Schlereth, introduction to “The History behind, within, and outside the History Museum,” in *Cultural History and Material Culture: Everyday Life, Landscapes, Museums* (Charlottesville, Va.: University Press of Virginia, 1992), 303-304.

¹⁹ See for example the Online Exhibits on the American Philosophical Society Web site, <http://amphilsoc.org/library/exhibit>, many of which incorporate images of artifacts and associated text which appeared in display cases in the Library. Aside from questions about the nature of the display—such as the ways in which a physical arrangement of artifacts can influence visitors in a way that .jpgs cannot replicate—these online exhibits can also diverge somewhat in terms of content. I was a collaborator on the physical and virtual incarnations of the “Shaping North America” exhibit. The virtual exhibit includes only a handful of images, whereas Case IV alone featured a large map, five letters, fourteen photographs, and two photobooks. “Shaping North America: Politics & Exploration,” American Philosophical Society Web site, http://amphilsoc.org/library/lobbyexhibit/shaping_north_america (accessed 4 September 2014).

²⁰ Angela Hegadorn, personal conversation, 12 February 2014.

²¹ Shawn Beckett, personal conversation, 13 September 2013.

²² For an informal exchange of repository horror stories involving users wielding pens, white out, and saliva, see a Twitter conversation started by Kate Theimer, Twitter, 6 February 2014, 1:03 P.M., <https://twitter.com/archivesnext/status/431533549431189505> (accessed 6 February 2014).

²³ See for example Rebecca Goldman, Derangement and Description, <http://derangementanddescription.wordpress.com/tag/pens/> (accessed 20 January 2014).

²⁴ See, for example, the 2012 partnering between Temple’s Material Culture class and the Drexel Costume Collection. Seth C. Bruggeman, “Studies in American Material Culture,” Temple University History 8151 Web site, Fall 2012, <http://studiesinamericanmaterialculture.blogspot.com/> (accessed 4 September 2014).

²⁵ See Appendix A.

²⁶ For very different examples of Kickstarter advice and analysis, see Porter Gale, “6 Steps to Kickstarter Success,” American Express Open Forum, May 8, 2013, <https://www.openforum.com/articles/6-steps-to-kickstarter-success/> (accessed 1 July 2013); Jeanne Pi, “The Untold Story Behind Kickstarter Stats,” AppsBlogger, <http://www.appsblogger.com/behind-kickstarter-crowdfunding-stats/> (accessed 1 July 2013); Caroline McCarthy, “Kickstarting Innovation,” Google Think Insights, September 2011, <http://www.google.com/think/articles/kickstarting-innovation.html> (accessed 1 July 2013); Ethan Mollick, “The Dynamics of Crowdfunding: Determinants of Success and Failure,” *Journal of Business Study*, forthcoming, preprint, http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2088298 (accessed 1 July 2013).

²⁷ See Ratto for critical making and Norton et al for the IKEA Effect.

²⁸ Society of American Archivists, *Describing Archives: A Content Standard, Second Edition* (Chicago: Society of American Archivists, 2013), vii-viii, PDF Edition.

²⁹ Peter Hirtle, “The Impact of Digitization on Special Collections in Libraries,” *Libraries & Culture: A Journal of Library History* Vol. 37, No. 1 (Winter 2002), 49-50, <http://hdl.handle.net/1813/14206> (accessed 12 April 2013).

³⁰ Cook, 517.

³¹ See for example Alison Leigh Cowan, “Leaving Cloister of Dusty Offices, Young Archivists Meet Like Minds,” *The New York Times*, April 28, 2013, <http://www.nytimes.com/2013/04/29/nyregion/archivists-bringing-past-into-future-are-now-less->

cloistered.html?pagewanted=all&_r=0 (accessed 16 February 2014); Anne Wootton, "Pop Up Archive Breathes New (Media) Life into Dusty Archives," PBS.org, December 4, 2012, <http://www.pbs.org/idealab/2012/12/pop-up-archive-breathes-new-media-life-into-dusty-archives334/> (accessed 16 February 2014).

³² For stock images, see for example Jean Assell, "Quiet, Please!" Getty Images, image #157428768, <http://www.gettyimages.com/detail/photo/quiet-please-royalty-free-image/157428768> (accessed 16 February 2014); Pam Francis, "Female librarian holding finger to lips," Getty Images, image #LA4203-002, <http://www.gettyimages.com/detail/photo/female-librarian-holding-finger-to-lips-high-res-stock-photography/LA4203-002> (accessed 16 February 2014); Fuse, "Librarian Shushing," Getty Images, image #78718683, <http://www.gettyimages.com/detail/photo/librarian-shushing-royalty-free-image/78718683> (accessed 16 February 2014); Rubberball, "Portrait of a librarian with a finger on her lips," Getty Images, image #56347994, <http://www.gettyimages.com/detail/photo/portrait-of-a-librarian-with-a-finger-on-her-lips-royalty-free-image/56347994> (accessed 16 February 2014); Rubberball/Mike Kemp, "in the library," Getty Images, image #83605041, <http://www.gettyimages.com/detail/photo/in-the-library-royalty-free-image/83605041> (accessed 16 February 2014). For tattooed librarians, see Jill Harness, "11 Amazing Librarian Tattoos," Mental Floss, September 10, 2012, <http://mentalfloss.com/article/12483/11-amazing-librarian-tattoos> (accessed 16 February 2014); Daniel Lovering, "Rhode Island librarians seek to change image with tattoo calendar," Reuters, October 17, 2013, <http://www.reuters.com/article/2013/10/17/us-usa-librarians-tattoos-idUSBRE99G14C20131017> (accessed 16 February 2014). Though a more diverse selection of images is available if one wishes to illustrate a "librarian," the enduring power of the bespectacled white woman with a finger to her lips hints at problematic issues of gender and diversity within the profession, to say nothing of the limited respect and remuneration often attached to pink-collar work. Tattoos may undermine stereotypes of severe, humorless librarians, but their focus upon predominantly female bodies does little to challenge gender norms.

³³ For the use of interactive exhibits in lieu of collections, see the Ben Franklin House. Erin Shipley, "Friends of Franklin: Conflicted Transatlantic Interpretation of Benjamin Franklin in London" (Master's thesis, Temple University, 2014), draft provided by the author, March 2014. For an example of a makerspace hosted by a public library, see the Middletown Free Library's CreateSpace, <http://www.createspacemfl.com/> (accessed 16 February 2014).

CHAPTER 3

APPROACHES

In this chapter, I will outline strategies for deploying digitization and materialization projects in a repository. Traditional object analysis is the starting point, but each of three approaches to the digitization process encourages additional interaction with an artifact, its surroundings, and its history. Students adopt new perspectives as a requirement for performing the hands-on work of creating a digital model of an artifact. Each approach works as a stand-alone enhancement to object analysis, but all three may be applied for a more thorough program of inquiry.

In proposing strategies for integrating digitization and materialization into a repository's educational program, I take inspiration from Thomas Schlereth's approaches for historic house museums. Like Schlereth, I believe there is value in revisiting the same artifacts and asking different questions of them. I also acknowledge the practical benefit of projects which can be scaled down or implemented in a modular fashion, as a means to accommodate limited resources or logistical challenges. My primary interest is bringing the public into the repository, where they can encounter and interact with artifacts—and technology—in unexpected ways.

Schlereth envisioned a partnership between local teachers and museum staff, with an interdisciplinary learning experience geared for high school or college students. He devised an ongoing program of inquiry in which students complete seven proposed approaches to a house museum and engage in a widely interdisciplinary learning experience. By studying house forms and types, interior space concepts, furnishings and

household artifacts, geographic and ecological relationships, literary and symbolic interpretations, architectural features and styles, and museum interpretation analysis, students would be exposed to a variety of disciplines: cultural anthropology and folklife, environmental and social psychology, decorative arts and social history, cultural and historical geography, American studies and literary history, architectural history, and museum studies. Each of these approaches has three components: inquiry focus (details of the approach and the questions it poses), student projects (suggested class exercises and techniques), and bibliographic resources (literature available for use by teachers and curators).¹

Like Schlereth, I propose multiple approaches to the same artifact. My artifacts are obviously much more modest in scope than a house museum and all its contents; three approaches seems sufficient. Multiple attempts to digitize and materialize the same object could not only result in fresh insights, but also build familiarity and encourage the sort of playfulness known to enhance learning.² Each of my approaches to digitization provides a fresh perspective, but may not all be feasible for every artifact. The first requires the artifact; the second requires documentation; the third requires a very permissive curator.

Schlereth's emphasis on adaptability is particularly appealing for my application. His approaches can be adapted for different educators or audiences. All seven may be undertaken, providing students with a chance to examine the same house from a variety of approaches, with the insights from one discipline influencing later analysis. Alternatively, the strategies may be deployed piecemeal. Each is self-contained and pedagogically valuable.³ I seek to employ the same sort of modularity in proposing

methods for digitization and materialization. Several of the educational goals are met when students take a single pass at an artifact: hands-on learning, exposure to material culture methodology, introduction to digital tools, on-site work at the repository. A failed materialization is a valuable exercise, if students understand that analyzing the process and diagnosing problems is an intellectual endeavor rather than a punishment.

There is disciplinary overlap in my approaches. The starting point of the project (regardless of how many approaches are used) is an object analysis. Material culture theory and methodology are applicable to all, as are history and the digital humanities. Facility with photography and fine arts could inform the first approach. Computer assisted design (CAD), and potentially trigonometry or engineering, could assist with the the second approach as well as the third, which could also benefit from a mechanical engineering perspective. Each subsequent approach creeps farther along the STEM continuum. Students who may be intimidated by technical challenges, who “know” that they are not good at or uninterested in STEM subjects, are progressively exposed to those disciplines. The interdisciplinary nature of each approach reflects the public history ethos behind the project.

Approach Components

The starting point of all three approaches is an object analysis. This follows established material culture methodology, primarily drawing upon Prown. Many of the bibliographic resources are required for this portion of the project, and focus upon the historical context (general and particular) of the chosen artifact. Students have an opportunity to further explore the repository’s collection in an effort to contextualize the

artifact. They should also investigate accession information and consider what the repository's documentation says about how the artifact came to be in a particular collection in a particular repository.⁴ An artifact must be examined thoroughly before it can be digitized and materialized.

The inquiry focus of the three approaches shifts between artifact and object. The first approach allows for an extension of traditional object analysis as the process of digitization and materialization forces students to confront choices in the representation of an artifact. The second approach deepens contemplation of the object's history and its intersection with the repository as an artifact. This approach calls not only for consideration of the object's original place, but where echoes of it might linger: repository documentation, period sources, or the collector's marketplace. The third approach is an examination of the object's role. It is that utility, and not merely the physical silhouette, which is to be reproduced.

The three approaches branch off in their framing of the meat grinder. The first considers it as a static artifact. The second considers it as an absent object. The third considers it as a machine. These frames offer an opportunity to extend traditional object analysis. The first is an extension of the description phase, the second and third serve to extend deduction and speculation. (At least primarily; as Prown notes, the border between these phases is necessarily—and fortuitously—porous.)⁵ The three approaches build on another, if all three can be implemented; but they individually build on object analysis.

The basic framing of the artifact will change the nature of the digitization and materialization project. There is, of course, some overlap: the same software and printing options may be deployed. But the method of input may be different. For the first

approach, students can stitch together a series of photographs. For the second approach, they may need to create a model from scratch using their software's drafting capabilities. For the third approach, they can use a combination of data (measurements or photographs) based upon the extant artifact and research into other methods of solving the mechanical problem addressed by a utilitarian object.

The bibliographic resources for the meat grinder's object analysis and history includes: Germantown's cataloging worksheets and Fair Market Value Appraisal (accession documentation); Charles F. Montgomery's "The Connoisseurship of Artifacts" and Jules David Prown's "Mind in Matter" (material culture); Donna R. Braden's "'The Family That Plays Together Stays Together,'" Karen Calvert's "Children in the House, 1890 to 1930," and Ruth Schwartz Cowan's "Coal Stoves and Clean Sinks," (social history); and the Haines Papers (a collection relating to the family that owned the artifact). Additional resources, largely non-academic in nature, can offer practical assistance for the digitization and materialization portions of the project. The list may include publications such as *MAKE*, but should also embrace informal (and often more timely) sources of information, such as software support forums, blog posts, and personal interactions. The second approach invites a search for outside representations of the meat grinder, essentially creating a second round of research. Various eBay listings provide written descriptions and photographs of equivalent objects. The reverse engineering of the third approach encourages engagement with mechanical questions. Adaptable 3D models may already exist for some components. A search of the Thingiverse Web site reveals a number of different screws, which might be referenced to replicate that part of the meat grinder. Patent applications or contemporary objects can offer insights about the

inner workings of mechanical artifacts, thus offering assistance to modeling absent objects or disassembling artifacts in the repository.

Approaches

Approach 1: The artifact as a static object

This approach treats the meat grinder as a static object. Method strongly informs this conception of the artifact. The digitization will be accomplished by taking photographs of the meat grinder. Its physical presence obviates the need for research into its physical attributes. The object answers questions about its own instantiation, without the mediation of written descriptions, measurements, or extant photographs.

This method encourages the object to be viewed as a static occupant of positive space. The interior is irrelevant at best, an encumbrance at worst. Only what can be seen by the camera can be reproduced. The cost of 3D printed objects is determined by the volume of material used, thus encouraging all models to be hollowed out.

Arranging the artifact for photography raises questions of orientation. If used in a kitchen, a meat grinder has a “correct” orientation. However, screwing it into place on a counter introduces an additional complication for generating (and cleaning up) a 3D model. Placing the object on a quilter’s cutting mat provides a set of useful reference points. If necessary, a full set of photographs can be taken with the object oriented in different ways. Multiple models can then be generated and “stitched” together to provide a complete model of the object.

Orientation is also a consideration for production. Angles of more than 45 degrees could result in an unprintable model.⁶ The bottom of the model is most easily treated as

solid and flat. The printed object is meant to sit on a base, regardless of whether or not the scanned object has a base.

Most significantly, this approach requires that the object be frozen in a single position. A meat grinder is defined by its moving parts, including those which cannot be captured in photographs. A handle cranks internal mechanisms to grind meat. A screw is adjusted to hold the meat grinder in place to accomplish its tasks. By rendering the meat grinder static, it is robbed of its ability to function. A meat grinder printed in this way is no more functional than a photographic representation.

Approach 2: The artifact as an absent object

This approach treats the meat grinder as an absent object to be recreated through research. Let us imagine that Accession Number 1995.15.33(.2) does not physically exist in the Germantown collection. Perhaps, after having the meat grinder appraised with the rest of the collection, Rachel Wilson opted to retain it. Perhaps the meat grinder was mislaid, abandoned and unidentified in the corner of a storage closet, or incorrectly cataloged. Perhaps it was stolen by a connoisseur of twentieth-century kitchen toys, or deaccessioned from the collection. Whatever the circumstances, this meat grinder is gone.

Let us further imagine that we wish to study this piece of no-longer-extant material culture. We are fortunate that the meat grinder is not a singular artistic invention, but rather a mass produced item, with a form which largely follows function. Research can tell us much about the physical attributes of the meat grinder.

At the time of its accession, the meat grinder was described in some detail: dimensions, materials, mark, functional elements, date, and condition. The meat grinder

is described as 3-1/2 in. (8.8 cm) wide and 5 in. (12.7 cm) long, made of cast iron, with a working handle and key-shaped screw, and in good (slightly rusted) condition. The “Made in U.S.A.” inscription is noted, and a sketch of the logo is included.⁷ One could attempt to create a model of the meat grinder based upon this information.

But this information is also useful for identifying equivalent meat grinders. Straightforward Google searches (“meat grinder toy”) uncover what appears to be the same meat grinder for sale on eBay. If we wanted to replace or recreate a no-longer-extant meat grinder, we could obtain a copy for about \$15. Even eBay sellers’ photographs could prove useful, especially in conjunction with the accession information. Photographs of the meat grinder in the collection could also provide a visual reference.⁸

The meat grinder—or virtually identical meat grinders—are sufficiently well documented that a 3D model could be developed from various sources. The printed object would serve as an imperfect replica, a stand-in for a lost piece of history. In some situations, it would be a useless replica. If the Germantown Historical Society wanted to recreate a child’s play room using period artifacts, a plastic print would obviously be out of place. Scholars of twentieth-century toys or material culture would learn little about the original object.

But that same gap between original and reproduction could usefully underline the process of preserving the past. When confronted with museum artifacts—whether lining shelves or arrayed in a recreated period room—it is easy to focus on what is present and forget about the artifacts which have not been preserved. If we forget what has not been preserved, some stories of the past cannot be told. We fail to imagine the role those missing artifacts played in the lives of people. We also fail to consider the process of

preservation: the limited resources available to repositories, the political and economic factors which designate certain artifacts—and the stories they tell, and the people about whom they speak—worthy of preservation. By creating a stand-in for the meat grinder, we do not so much recreate the object as delineate the space it might occupy. A careful replication of the artifact is a matter of working in positive space: the attributes of the printed artifact (no matter how they diverge from the original) are of interest. But an inference-based replication of the object is particularly well-suited to calling attention to negative space: the social and material context in which the object was used. The replica draws attention to the difficulties, and frequent necessities, of doing material culture in the absence of material.

Approach 3: The artifact as a machine

This approach treats the meat grinder as a machine to be replicated. A functional object can be reverse engineered by study and, perhaps, disassembly. In the case of the meat grinder, screws could be unscrewed, and all removable parts individually photographed, modeled, and printed. The printed components could be reassembled into an object that would mimic the functionality of the original: it could be affixed in place with a screw, and the crank handle would turn an internal mechanism. Depending upon the material used, it could successfully grind meat.

This proposal may initially feel radical, even when applied to mass-produced objects like the meat grinder. Repositories are concerned with the preservation of artifacts in their collection, not their disassembly. But this very sensible objection demands engagement with the concept of preservation.

Preservation is contested. As in any other specialized field, best practices and professional standards change over time. Anne Downey, the American Philosophical Society's Head of Conservation, is a proponent of minimally invasive preservation, in part because earlier standards were much more interventionist. Earlier generations of conservators took actions that, however well-meaning or compliant with best practices of the time, resulted in harm to the artifacts in their care.⁹ New techniques and technologies will continue to remake the field, and professionals can legitimately disagree on implementation strategies.

Preservation is also a difficult challenge. In an ideal world, artifacts are stored in environmental conditions most conducive to their long-term survival. In reality, roofs leak, resources are limited, and artifacts often enter repositories having suffered some degree of damage. The meat grinder, for instance, had rusted before it entered the Germantown collection.¹⁰ The pristinely preserved artifact is a rare beast—thus the \$1,800 price tag for certain Boba Fett action figures.¹¹

The pristinely preserved artifact is also somewhat lacking in historical interest. Context matters. Germantown's toy meat grinder does not exist in a vacuum. It is part of the collection because it was part of a large donation of dolls and toys. It is part of the Germantown story because of its provenance, not because of any particular physical attribute. Its rust is Germantown rust—or Mount Airy rust, and the question of whether or not that is a meaningful distinction is also part of the Germantown story.

An artifact's life within the collection can and should also be of interest. The conservator-scarred artifacts in the APS's collection tell a story about changing professional practices. Notations in ink in the Lewis & Clark journals speak to a late

nineteenth century focus upon the textual content, rather than the artifacts themselves.

Archives students of more recent vintage may also note the failure to rely exclusively on pencils, and feel that the removal of metal bindings was perhaps taking the “no metal fasteners” dictum to extremes.

In that context, disassembling an artifact does not seem so radical. In the best case scenario, it might encourage preservation measures more in line with keeping the artifact functional. It could result in a different relationship with the artifact: not merely a thing to be gazed upon on a shelf, the meat grinder would become an object that could fulfill its original purpose. The fact that it could be more easily photographed, modeled, and printed would merely be a bonus. And in the worst case, if the artifact sustained damage then that damage would stand as evidence of the types of inquiry and experimentation practiced in the repository.

By applying any or all of the approaches outlined above, it is possible to extend and enhance traditional object analysis methods. The modularity allows flexibility in developing a project, so that it may be tailored to the educational needs of the audience and the resources of the repository. In subsequent chapters I will turn my full attention to the Germantown meat grinder, performing object analysis and also implementing the digitization and materialization approaches outlined here.

¹ Thomas J. Schlereth, “Historic House Museums: Seven Teaching Strategies,” in *Artifacts and the American Past* (Nashville, Tenn.: American Association for State and Local History, 1980), especially 91-92.

² William J. Turkel and Devon Elliott, “Making and Playing with Models: Using Rapid Prototyping to Explore the History and Technology of Stage Magic,” in Kevin Kee, ed., forthcoming volume (10 March 2011 draft, supplied by the co-author 7 December 2012), 15.

³ Schlereth, “Historic House Museums,” 91.

⁴ Paraphrasing Heather MacNeil, "Trusting Description: Authenticity, Accountability, and Archival Description Standards," *Journal of Archival Organization* 7, No. 3 (2009), 99, DOI: 10.1080/15332740903117693 (accessed 19 November 2011), quoting Laura Millar, "The Death of the Fonds and the Resurrection of Provenance: Archival Context in Space and Time," *Archivaria* 53 (Spring 2002), 12-13.

⁵ Jules David Prown, "Mind in Matter: An Introduction to Material Culture Theory and Method," *Winterthur Portfolio* Vol. 17, No. 1 (Spring 1982), <http://www.jstor.org/stable/1180761> (accessed 23 August 2012), 9.

⁶ Bill Bumgarner, "Getting Started with a 3D Printer," *MAKE: Ultimate Guide to 3D Printing* (Make, 2012), 13.

⁷ B. R. Roberts, Cataloging Worksheet, Accession Number 1995.15.33(.2), August 21, 1995, Germantown Historical Society Accession 1995.15.

⁸ See Photograph 1.

⁹ Anne Downey, personal conversations.

¹⁰ Roberts, Cataloging Worksheet.

¹¹ plsvab, "A Guide to Vintage Star Wars Action Figures," eBay Buying Guide, <http://www.ebay.com/gds/a-guide-to-vintage-star-wars-action-figures/10000000001068796/g.html> (accessed 27 April 2013).

CHAPTER 4

RACHEL WILSON'S MEAT GRINDER

The use of object analysis methodology, combined with traditional forms of historical research, can reveal much about an object and its role in people's lives. In this chapter, I will perform an object analysis upon the meat grinder. I will interact with and consider the meat grinder as a physical object and speculate upon its use. My engagement with the physical object will be supplemented by historical research. I will examine the particular history of the meat grinder as documented by the repository as well as the broader historical context. The object allows me to explore gender roles, the significance of toys and childhood play, and the nature of housework.

I will also discuss my chosen terminology and methodology; an understanding of both is helpful to assess the effectiveness of my approach. Words matter and even synonyms are not wholly equivalent. The difference between an "object" and an "artifact" is subtle but important within the context of this paper. Elsewhere, of course, there may be no difference, or entirely different shades of meaning applied to one term or the other; varying usage makes explication of distinctions more important. My methodology follows the material culture practices that emerged from history's cultural turn. The limitations of the methodology is acknowledged even as it is articulated: purely artistic objects or elements are privileged over the utilitarian, and analysis is inevitably informed and circumscribed by the experiences of the analyst.¹ I am not a passive observer or transcriptionist in my creation of a story about the meat grinder.

Terminology

As a general practice, I will refer to the meat grinder as an artifact when discussing its life within the Germantown collection, and use the term object when discussing its prior existence. “Artifact” and “object” are synonymous in archival terminology, both referring to tangible man-made items. “Object” has a stronger implication of three dimensionality, which might render it marginally more appropriate when discussing a metal meat grinder. However, “object” is also intrinsic to computing-related terminology (e.g. digital object, object-oriented programming), whereas the digital uses of “artifact” are more limited.² I wish to be consistent and deliberate in my terminology, and overall I feel that “artifact” is more in keeping with archival usage. I will use that term to denote my perspective, which is informed by academic and practical experience in archives.

The shift in terminology will also signal the different meanings that are imposed upon material objects. The meat grinder did not undergo any physical change upon its accession, but human interaction with it did alter. Before it entered the repository, children played with it as a toy, engaging in imaginative play and preparation for life in the domestic sphere. After entering the collection, it became a tool for telling stories about the Germantown story. Both roles are real, and it is important to associate the meat grinder with both. Drawing a bright line at the date of accession may be an artificial distinction, and the “before” and “after” binary does not necessarily encourage a nuanced approach to the variation in use and meaning that the meat grinder may have experienced as an object or artifact. But the change in terminology will serve as a reminder that these are issues worthy of consideration.

I will make an exception and employ the phrase “object analysis,” even though it is performed upon an artifact within a collection. Within the discipline of material culture, “object analysis” is sufficiently recognizable that a change in terminology would seem confusing at best, duplicitous at worst. The use of “object” in this context will also signal the methodological shift in thinking. While archivists’ concerns are typically at the collection level—an aggregation of items of the same provenance—object analysis is tightly focused upon a single item. But even this distinction is problematic. Archivists have item-level interests, which may include the preservation of distressed artifacts, the evidence of one artifact providing context for another, and the digitization of particularly popular artifacts to facilitate access. Material culture studies, and Prownian object analysis in particular, serve as a means of enhancing historical knowledge, not ignoring it. Archival and material culture studies require an understanding of the historical context of objects, and each provides a pathway for enhancing that understanding.

Methodology

My object analysis methodology draws primarily from Jules David Prown, though it is informed by other scholars, particularly Charles F. Montgomery and E. McClung Fleming.³ The analysis comprises three steps: description, deduction, and speculation. Description involves substantial analysis (size, weight, materials, fabrication, form, function, condition), content analysis (decorative motifs, ornament, color, style, techniques, trade practices), formal analysis (color, texture), and provenance (creator, ownership, history, date). Deduction involves sensory engagement (appearance, perception of intended users), intellectual engagement (representational aspects, design

and functional performance), and emotional response (viewer reaction, evaluation).

Speculation involves the creation of theories and hypotheses about the object and its role, and the formulation of a program of research to answer those questions. These analytic steps need not take place in any particular order and will, in fact, inform one another.

Prown proposes a hierarchy of object categories, ranged from art to utilitarian.⁴

When applied to the meat grinder, this hierarchy points to an immediate source of tension. Is the meat grinder utilitarian? While one could use it to grind meat, and perhaps a child used it for such realistic play, actual food preparation is not the purpose of such a toy. Is the meat grinder art? It is of minimal utility, but as a mass-produced item in the form of a common kitchen implement, it is neither unique nor designed to be aesthetically pleasing. A meat grinder is a tool (category 6, devices), but *this* meat grinder is a toy (category 2, diversions).

Prown's categories are intentionally broad and suggestive. He assumes that refinements are required. In this case, classifying the object appears to be an exercise in futility—and perhaps it is, if one merely wishes to slot the object into the hierarchy. This, however, would be a mistake, not merely uninteresting but a misreading of Prown, whose methodology encourages flexibility and, more importantly, reflexivity. The important question is not “What category is correct?” Far better to ask how those categories interact, for what audience, and in what context. Does imaginative play elevate a utilitarian object? Does the utilitarian nature of the object erode the quality of the play? Is the meat grinder a means by which a (probably female) child explored the possibilities of the world? Or was her play constrained—rendered less artful—by toys which aped

utilitarian objects? Prown's hierarchy provides no answers, rather a framework for devising questions about objects and their roles in people's lives.

Montgomery's methods inform my own, but the implications of his methodology are as important to discuss as its details. Montgomery's approach privileges the subjective, sensual response to an object.⁵ I have employed that method, though the meat grinder is not exactly an objet d'art likely to catch the interest of art historians. I have extended that subjectivity to an outright sentimental approach: the meat grinder and associated items were toys, perhaps dearly loved or representative of happy, innocent times. Montgomery's influence is perhaps most obvious in my discussion of the value of the meat grinder. He was an acknowledged expert, with publications and academic appointments bolstering any appraisal he might offer. But he was a businessman, a dealer in antiquities, before his landmark academic work at the Winterthur Museum and the University of Delaware. This dual identity and the divergent experiences and expectations of Montgomery's roles raises important questions of authority and the problematic issue of monetizing collections held by public institutions.

The formal appraisal of the collection's kitchen toys carries the imprimatur of a professional appraiser, but that assessment is two decades old and does not address the value of the meat grinder in specific. The current market value of the meat grinder is derived from eBay auctions. The identity and expertise of the sellers is difficult to verify, as is that of the buyers. Members of either group may be woefully underinformed or the deeply knowledgeable sort of connoisseur Montgomery addressed. The tension of assigning a monetary value to an object is highlighted in this instance. Should it be assessed as art or a utilitarian object? Is the judgment of an expert more valuable than

those engaged in commerce? What is the context of those judgments? Who has the authority to make such decisions, from where do they derive that power, and how are they held accountable? Does the appraised worth of a collection merely provide researchers with additional data—or does it have the potential to add value or risk deaccession-for-profit during economic downturns?

The monetary value of the meat grinder speaks to its original role and also the means by which it entered the collection. Kitchen toys invited girls to play at an adult role; such hands-on labor had, during the meat grinder's period, become the hallmark of middle-class housewifery.⁶ If designed as a toy, the meat grinder could target (in terms of interest and pricing) that middle-class audience of future housewives, perhaps ignoring the much smaller pool of upper-class girls who could expect to employ domestic servants and poor girls without extensive toy collections. If the meat grinder was, in fact, a salesman's sample, its makers must have assumed the possibility of loss or specifically intended to give the samples away to potential customers. The meat grinder was part of a donation to Germantown which was appraised for tax purposes. Money may not have been the donor's sole motivator, but neither was it ignored. The economic tale of the meat grinder did not begin and end with its original acquisition, but informed its entire existence as both object and artifact.

Meeting the Meat Grinder

My initial response, upon seeing the meat grinder, was to ask "What is that?" Because I asked the question aloud, I learned immediately that the artifact was a meat

grinder. I lost an opportunity to interrogate an uninformed introduction to the artifact, but can still discuss my initial reaction and the context of the artifacts in the collection.

The first issue is my failure to recognize a meat grinder. My kitchen is populated with a number of gadgets, which see a varying amount of use. They include such items as a stand mixer, a food processor, a blender, an immersion blender, a rice cooker, a waffle iron, and an electric tea kettle. Though my spouse and I both cook—often from scratch and frequently using meat—we rarely have cause to process meat, and on those occasions when we do another tool accomplishes the job. (Our kitchen is generally free of the single-use tools *Good Eats* host Alton Brown spent a decade and a half disparaging as “unitaskers.”) Manual meat grinders, with a form factor very similar to the toy, remain on the market alongside electric options.⁷ My personal blind spot was particular to the type of cooking I do, and the type of kitchen tools I tend to use.

Germantown’s meat grinder is housed on a shelf with other miniature kitchen tools, in an area devoted to toys. (See Photograph 2.) The meat grinder sits near other miniature domestic items, including a kettle, iron, and tea set. This adjacency implies not only its identity as a toy, but as a “girls’ toy” centered upon the kitchen and domestic play. But the knowledge that Germantown Historical Society also collects tools, combined with the very prominent screw, could prove something of a distraction. The shape is reminiscent of a vice—and in fact the meat grinder clamps in place in a vice-like manner—providing momentary confusion as to the artifact’s primary function, and which components perform it. The collection also includes “boys’ toys,” and a toy car sits on the shelf below the meat grinder. Notions of gendered play, and the gendered spaces of kitchen and workshop, may have contributed to my initial confusion.



Photograph 2. The meat grinder in its place on a Germantown Historical Society shelf. Photograph taken with the LG smartphone.

Object Analysis

The artifact is a small metal meat grinder, silver in color. It is not particularly reflective, and exhibits some rust. It has a logo—"CA" or "AC"—and "MADE IN U.S.A." in raised letters. It is dated between 1920 and 1940. Accession documentation includes measurements of 5 inches long and 3-1/2 inches wide, and notes that the crank is operational.⁸ A formal appraisal identifies the material as cast metal with nickel plating.⁹ Serif text is used for the letters in the logo, but sans serif is used for the manufacturing location. A conscious design decision is implied, and the logo presumably appeared on other products and packaging.

The donation was appraised for tax purposes in 1995, with a total value of approximately \$6,000. The set of miniature kitchen toys, in “good to excellent” condition, was valued at \$178.00. The appraised set included the meat grinder, tin hand mixer in glass bowl, tin coal iron and trivet, tin and copper tin molds, a pair of candy tongs, sifter, muffin tin, pierced spoon and spatula, cast iron balance scale with tin scoop (missing one weight), Arcade stove top waffle iron, six piece English tin canister set, and a Revere tea kettle in box.¹⁰

A Web search revealed several eBay auctions of what appear to be the same meat grinder. It is often described as a child’s toy or salesman’s sample. The manufacturer is rendered as “AC” or “CA,” depending upon the seller. Most use the term “vintage,” though the word “antique” also appears, and descriptions of the material include cast iron and chrome or nickel plating. Based on the winning bids of three completed auctions (\$9.99, \$10.49, and \$16.37), the consensus on the Internet appears to be that the meat grinder’s current market value is about \$10.00 to \$15.00. Not all auctions ended in a sale. One seller offered the item twice, first with a starting bid of \$14.99 and then \$9.99, but received no bids; the third time was a charm, however, and the seller ultimately sold the meat grinder for \$16.37. The auctions which ended in sales did not feature many bidders (1, 2, and 10), demonstrating that there is modest interest in such items, but not great demand. None of the disappointed bidders were willing to purchase the meat grinder from a different seller with a “buy it now” price of \$24.99.¹¹ Modern, full-sized, functional kitchen tools similar to the meat grinder are sold online. Their market value is between \$20.00 and \$30.00.¹²

Regardless of whether the meat grinder was originally intended as a toy or a sample, it was surely used as a toy. The donors perceived and classified it as such. The meat grinder entered the GHS collection along with a number of other toys and dolls.¹³ And the meat grinder was actively used, as opposed to collected. Only one of the kitchen toys entered the GHS collection with its original box, and the scale was missing a weight. The original owners did not trouble to preserve material that would be of interest to collectors, and perhaps result in a higher appraisal value when it was time to sell or donate the toys.

The scope, age, and nature of the collection allows speculation about the owners. The donors obtained an appraisal and requested that GHS document the donation for tax purposes.¹⁴ This implies a certain degree of familiarity with tax codes and the financial position to take advantage of that knowledge. The Wilsons' 1995 residence, a six bedroom Mount Airy home, was sold in 2007 for \$780,000.¹⁵ Even allowing for the vagaries of real estate pricing, a financially comfortable existence is implied. The donors had the luxury of giving away \$6,000 worth of items, receiving in return tax benefits and the emotional satisfaction derived from contributing to the collection.

There are indications that the emotional factor was important. Several items were appraised but not ultimately donated, including Kiddicraft building beakers.¹⁶ There is a certain poignancy to the handwritten notes in the appraisal document: "Retained by owner." These mid-century toys may have been impersonally mass produced, but that did not prevent consumers from developing a personal relationship with the objects, and adopting the affirmative role of "owner." One imagines that particularly pleasant memories attached to the retained objects, complicating their surrender. Perhaps the

prospect of another generation of users made the thought of Kiddicraft blocks sitting on a repository shelf unpalatable.

The collection was amassed over many years, conjuring images of multi-generational use of the toys. A decanter set circa 1900, a tin kaleidoscope circa 1930, and a 1950 copy of *My Jungle Book* were likely not acquired for use by the same children.¹⁷ But they may well have been used by subsequent generations, not merely kept by the original owner for sentimental reasons. The gendered nature of the toys offers hints about the sex of children in the family. The dolls and miniature domestic toys speak to the presence of female children, and construction toys speak to the presence of male children.

History of the Meat Grinder as Object and Artifact

The archival perspective can effectively address material culture problems. Prown's introduction to material culture theory and method does not explicitly address archives and artifacts' lives within a collection. However, the role of professional, purposeful collectors of artifacts is implicit. Prown makes reference to cultural institutions, "attached value"—worth which may be attributed to an object by the original users or subsequent individuals—and "distortions of survival."¹⁸ Making such value judgments and distorting the historical record (in, ideally, a beneficial manner) is the archivist's stock-in-trade.

Archivists are deeply concerned with context. When evaluating the material in their care, archivists speak in terms of "context" and a constellation of issues—creator, provenance, origin, etc.—that have direct bearing upon it.¹⁹ The fundamental concept of provenance is based upon the relationship of items in a collection—both before and after

it enters the repository. Provenance, if thoroughly understood and documented, can help explain how artifacts “come to be *here*,” in a particular collection in a particular repository.²⁰ Original order is something to be respected, sometimes obvious but often divined by the archivist. Arrangement is a process, though it may be transparent to users.

The Wilsons’ donation may be understood as a collection, not merely a group of objects, and this approach allows us to say more about the meat grinder. It was specifically classified as a toy in the formal appraisal. It is not clear how much of the classification was performed by the Wilsons, and how much was imposed by the appraiser. However, the Wilsons commissioned the appraisal and were presumably satisfied with its accuracy. Furthermore, it was specifically classified as a “Miniature Kitchen Toy,” a subgroup of “Doll Accessories”—by implication, a girl’s toy. From an archivist’s perspective, the documentation surrounding the accession speaks to the intellectual organization of the donors’ materials. It also informs the physical arrangement of artifacts on GHS’s shelves.

It is highly probable that the organizational structure of the appraisal and donation accurately reflected the object’s use. Assuming that the meat grinder was, actually and by intent, used alongside similarly domestic-themed toys is probably not a distortion imposed later by the Wilsons, the appraiser, GHS, or myself—but it is still important to interrogate that assumption. The gendered nature of play and toys is something noted by scholars in many fields, cultural critics, and attentive parents. Legos provide a useful example. A 1981 ad currently enjoying viral popularity online features a red-headed, sneaker-shod, denim-wearing girl, a range of primary and neutral colors, and the tag line “What it is is beautiful.” But as media critic Anita Sarkeesian illustrates, the apparent

gender neutrality of the red-headed girl stands in sharp contrast to the company's strongly gendered marketing after the mid-1980s. Equal-opportunity Lego marketing did not simply happen because an advertising agency employed a woman as creative director; it was also aimed at the strictly gender-policed suburbs of the 1950s.²¹ Blakemore and Centers, approaching the issue from the field of psychology, discuss the gendering of toys in recent decades. Though the studies they perform and cite fall well after the meat grinder's period, the observations about strong gender coding and assumptions are in line with historical interpretations of the meat grinder's period.²²

In order for the meat grinder to be a child's toy, it was first necessary for there to be such a class of objects. As imaginative play achieved social acceptability, it also took on an educational and socializing purpose. The Victorian middle class viewed make-believe as a "harmless pleasure," in contrast to earlier generations of American parents who equated imaginative play with lying. The Victorian nursery often included educational toys and miniaturized adult objects. In this way, children were prepared for adulthood.²³ The late nineteenth century saw the beginning of mass produced home amusements. Games began to emphasize worldly skills rather than moral virtues. They were also a means to encourage family unity. A 1931 publication advocated family game nights because "the family that plays together, stays together."²⁴ Two decades later, families gathered around the television would see advertisements featuring families building Lego creations together.²⁵

The pleasures of play came to be considered harmless, but they were by no means useless. Play served a social agenda: training children for future careers, delineating gender roles, and supporting the family structure. Within the home, children's gender was

coded by material objects. By 1910, boys' rooms were spartan, filled with wood and metal furniture, and beginning to take on a military appearance. Girls' rooms tended to floral and pastel decor and a Victorian frilliness—though the frills faded by 1920, along with the nursery. Children, singly or grouped by gender, stayed in a room meant to “grow with the child.”²⁶ Childhood was no longer a period of morally threatening and threatened semi-humans, but a time to set expectations for adult behavior.

The meat grinder speaks to the changing role of women's work. Prior to the Depression, plumbing moved indoors. By 1941, 80% of American homes were wired for electricity. Nearly as many had electric irons and about half of households had power washing machines, refrigerators, and vacuum cleaners.²⁷ These technical advances helped fill the gap as domestic servants and commercial services disappeared during the same period when standards for housework rose. Nonetheless, by 1940 middle-class housewives spent more time on housework than they had thirty years earlier. Longer hours were accompanied by a demotion. The turn-of-the-century housewife was a manager, but by 1940 she was a worker.²⁸ In housewives' new role as labor, rather than management, their hands operated meat grinders. The toys used by their daughters reflected this reality and expectations of future adult responsibilities.

History of a Family

William H. Haines (1854-1929), the donor's grandfather, was the president of a plumbing supply company, Haines, Jones & Cadbury. His wife, Mary Howell Haines (1856-1885), died after the birth of their fourth child and her sister, Phebe Emlen Howell (1858-1940), cared for the children. Eight years after Mary's death, William and Phebe

married. The eldest boy, Joseph H. Haines (1878-1957), married Helen Whitall (1890-1917) in 1916, and in 1922 married an Englishwoman, Margaret Mary Clark (1886-1968). The donor was born Rachel Margaret Haines in 1924.²⁹

The Haines family had a strong connection to the Germantown area. William Haines built a house on Wayne Avenue (later demolished to make way for an apartment building). Joseph and Margaret Haines lived at 130 West Walnut Lane for the entirety of their married lives; the Wilsons' Mount Airy home was a mile and a half away. They all belonged to the Germantown Friends Meeting on Coulter Street.³⁰

Rachel Wilson's story is directly entwined with two of the foundational stories of the early twentieth century: World War I and emerging technologies of domesticity. Joseph H. Haines served in France with the American Friends Service Committee (AFSC). A 1918 letter home recounts a day spent bicycling and picnicking with a Miss Clark.³¹ In the most trite of counterfactuals, without the upheaval of the war Haines and Clark might never have met—or, slightly more subtly, settling in Germantown may not have been so appealing. Haines liked France and considered buying “a gem” of a chateau in Touraine, but worried about the possibility of a “Social Revolution” in France or Great Britain that might “upset land tenures etc.”—something he guessed not to be a risk in the United States.³² He had a great deal of sympathy for socialism: “these crazy fanatics in Russia” had the potential to save the world from future armed conflicts and the excesses of capitalism. But he understood that his personal interests did not align with the proletariat's.³³ Joseph Haines's economic security was a result of capitalism in general and domestic technologies in specific. Haines, Jones & Cadbury was a plumbing supply company, an entity which was both predicated upon and necessary to the spread of indoor

plumbing—part of the technological shift that fundamentally changed housework in the United States.³⁴

The letters Joseph Haines wrote to his father while in France offer snapshots of gender relations, albeit in the extreme situation of a war-torn country and with an eye to censors.³⁵ Haines dealt with refugees and impoverished civilians. Many were women and children, and he formed ongoing relationships with some. The women were reliant on men: those present, like Haines, who made their lives better; those absent, dead or fighting, who left them in dire economic straits; and those from Germany, who were responsible for the hardship they faced. In several letters Haines mentioned the “hard-working and practical” widow Mme. Debailly. He approved of her decision to buy her daughter a communion dress using some of the money he sent her, so that the girl could be presented “without being ashamed of herself”: material goods were not simply a matter of life and death, but also social well-being.³⁶

American women who proactively aided war victims and the AFSC were framed in reactive or purely domestic ways. Haines related a humorous anecdote of a man who inadvertently drank a beauty product (perhaps face wash: Haines was not clear on that detail) which relief workers from Smith College had stored in a whiskey bottle. The man became quite distraught, fearing that he was poisoned by “something that the girls carried with them to drink in case they were captured!”³⁷ Male relief workers were, apparently, assumed to be less well-prepared for suicide. Haines noted a need to examine nurse’s aids before sending them into the field, otherwise their primary (and distinctly non-professional) virtue—enthusiasm—“sometimes leaks out.”³⁸ A gender divide in personal relationships was also apparent. Haines wrote to his father about matters of business,

taxes, and politics. He received care packages—mittens, socks, and food—from women. Based upon his requests that his father pass along thanks, his contact with those women was sometimes limited to material objects and did not include written correspondence.³⁹ Even when working toward the same goal, men and women did not operate in same spheres.

As a young woman, Margaret Haines was involved in various Quaker organizations and hiking groups in England. (One guesses that, on bike or on foot, she had no trouble keeping up with Joseph Haines.) She was involved in missionary work, served as an officer in the Missionary Helpers' Union, and traveled to India and Ceylon. After emigrating, her missionary work continued with the Philadelphia Mission Board.⁴⁰

That missionary work often focused upon the domestic sphere. Letters to the Newcastle-on-Tyne Junior M.H.U. thanked the organization for material aid—parcels including clothes, toys, and books—and described the joy of the young recipients.⁴¹ S. Katherine Taylor, in a letter also illustrative of the exoticism of India, framed the expanding education of girls as a good thing. The evidence and driving force for this was, however, the marriageability of educated girls, not their ability to use their education to take on non-domestic roles.⁴² Haines's decades of work exposed her daughter not only to the commitment of an activist, but to the acceptable types and targets of her activism.

Margaret Haines also demonstrated a care for material goods and the stories attached to them. She emigrated as an adult, but took the trouble to bring childhood toys and other possessions from England to America. Ink bottles testified to the trip to India a decade before her daughter's birth.⁴³ The dolls Lily, Harebell, and Rob Roy were available for play—but the fact that Rachel Wilson knew their names indicates they were

also subjects of conversation, perhaps a means for her mother to talk about her childhood.⁴⁴ A set of glasses were purchased “by saving up pocket money”—a story of patience, a desire postponed but eventually fulfilled.⁴⁵ Nearly thirty years after Haines’s death, those personal details were remembered and recorded.

Rachel Wilson took an active role in the preservation of her family’s history. She donated an extensive collection of artifacts to the GHS, but also provided a brief family history and, in the case of some objects, detailed provenance information. These notes confirm speculation about the multi-generational and -gendered nature of the ownership and also preserve small memories and pieces of family and local history: a toy cigar bed box from Wilson’s childhood was probably made by the family’s chauffeur, and in 1958 Wilson’s son shopped at Killians in Chestnut Hill to buy his sister a bubble-blowing monkey as a birthday gift.⁴⁶

It was Wilson who donated her late father’s papers to Haverford College. She may have been the one to have them typed and offered for publication; at the time of writing, Joseph Haines denied such an intent.⁴⁷ A notation in the collection states that, as of 1988, the original letters remained in Wilson’s possession—as anticipated in the note, they did subsequently make their way into the collection—but donating material and building the Haines family collection was an ongoing process, more collaborative than simply handing over a box of artifacts. Wilson’s own words are in the background, relegated to documents *about* the collections, but her intentions infuse the collections and are the motivating force behind their existence.

The application of object analysis and traditional historical research allows engagement with the meat grinder and suggest the role it may have played in people's lives. As a kitchen toy from the first half of the twentieth century, it is deeply embedded in a story of American childhood, play and toys, as well as women's experience as housewives. As an artifact in a larger collection, it illustrates the accretion and classification of a family's toys and particularizes broader social trends. Investigation of the meat grinder illustrates the value of material culture methodology and the value of considering an artifact's context within a collection and a repository. In subsequent chapters, I will explore the further insights that can come when one takes the additional steps of digitizing and materializing artifacts.

¹ Jules David Prown, "Mind in Matter: An Introduction to Material Culture Theory and Method," *Winterthur Portfolio* Vol. 17, No. 1 (Spring 1982), 15-16, <http://www.jstor.org/stable/1180761> (accessed 23 August 2012).

² See Richard Pearce-Moses, *A Glossary of Archival and Records Terminology* (Chicago: Society of American Archivists, 2005), PDF Edition, especially 36, 270, for SAA terminology.

³ E. McClung Fleming, "Artifact Study: A Proposed Model," *Winterthur Portfolio* Vol. 9 (1974): 153-173, <http://www.jstor.org/stable/1180572> (accessed 23 August 2012); Charles F. Montgomery, "The Connoisseurship of Artifacts," in Thomas J. Schlereth, ed., *Material Culture Studies in America*, (London: Altamira Press, 1999), 143-152; Prown, "Mind in Matter." For discussion of object analysis methodology used in an earlier graduate project and largely duplicated here, see Megan Miller, "Object Analysis Method," Owls All the Way, September 9, 2012, <http://owlsalltheway.wordpress.com/2012/09/09/object-analysis-method/> (accessed 29 April 2013).

⁴ Prown, 3.

⁵ Montgomery, 145.

⁶ Ruth Schwartz Cowan, "Coal Stoves and Clean Sinks: Housework between 1890 and 1930," in Jessica H. Foy and Thomas J. Schlereth, eds., *American Home Life, 1880-1930: A Social History of Spaces and Services* (Knoxville, Tenn.: University of Tennessee Press, 1992), 213-215, 218.

⁷ See for example "CucinaPro 265-08 Healthy Meat Grinder - #8," Amazon.com, http://www.amazon.com/CucinaPro-265-08-Healthy-Meat-Grinder/dp/B0000DE4LW/ref=sr_1_10?s=kitchen&ie=UTF8&qid=1367252059&sr=1-10 (accessed 29 April 2013); "LaCuisineTM #10 Hand Operated Meat Grinder," Amazon.com, http://www.amazon.com/LaCuisineTM-Hand-Operated-Meat-Grinder/dp/B006481WHW/ref=sr_1_21?s=kitchen&ie=UTF8&qid=1367252059&sr=1-21 (accessed 29 April 2013); "Meat Grinder with Table Clamp," Amazon.com, http://www.amazon.com/Meat-Grinder-with-Table-Clamp/dp/B001TA8YWQ/ref=sr_1_14?s=kitchen&ie=UTF8&qid=1367252059&sr=1-14

(accessed 29 April 2013); “Weston Meat Grinders,” Amazon.com, http://www.amazon.com/Weston-Heavy-Manual-Tinned-Grinder/dp/B000BQSW44/ref=sr_1_5?s=kitchen&ie=UTF8&qid=1367252059&sr=1-5 (accessed 29 April 2013).

⁸ B. R. Roberts, Cataloging Worksheet, Accession Number 1995.15.33(.2), August 21, 1995, Germantown Historical Society Accession 1995.15.

⁹ Barry S. Slosberg, Fair Market Value Appraisal for Federal Tax Donation Purposes Only, prepared for James D. and Rachel H. Wilson, March 22, 1995, Germantown Historical Society Accession 1995.15, item 33.

¹⁰ Slosberg; see item 33 for the kitchen toys.

¹¹ Ewkauctions, “Vintage Miniature AC Metal Meat Grinder 5” Tall Salesman Sample or Childs Toy,” Ebay sale page, <http://www.ebay.com/itm/Vintage-Miniature-AC-Metal-Meat-Grinder-5-Tall-Salesman-Sample-or-Childs-Toy-/400305140729> (accessed 27 April 2013); From-my-attic-to-yours, “Vintage Childs Toy Cast Iron Meat Grinder AC 5”x3 1/2”,” Ebay auction ending March 10, 2013, http://www.ebay.com/itm/VINTAGE-CHILDS-TOY-CAST-IRON-MEAT-GRINDER-AC-5-x3-1-2-/390554799870?ViewItem=&item=390554799870&lgeo=1&vectorid=229466&nma=true&si=4hprmZEtWJ0Js7aL%252FNwXXiFYXEI%253D&orig_cvip=true&rt=nc&_trksid=p2047675.l2557 (accessed 27 April 2013); From-my-attic-to-yours, “Vintage Childs Toy Cast Iron Meat Grinder AC 5”x3 1/2”,” Ebay auction ending April 2, 2013, http://www.ebay.com/itm/VINTAGE-CHILDS-TOY-CAST-IRON-MEAT-GRINDER-AC-5-x3-1-2-/271180258069?pt=Vintage_Antique_Toys_US&hash=item3f239a5b15&nma=true&si=4hprmZEtWJ0Js7aL%252FNwXXiFYXEI%253D&orig_cvip=true&rt=nc&_trksid=p2047675.l2557 (accessed 27 April 2013); From-my-attic-to-yours, “Vintage Childs Toy Cast Iron Meat Grinder AC 5”x3 1/2”,” Ebay auction ending April 11, 2013, http://www.ebay.com/itm/VINTAGE-CHILDS-TOY-CAST-IRON-MEAT-GRINDER-AC-5-x3-1-2-/390571828094?nma=true&si=4hprmZEtWJ0Js7aL%252FNwXXiFYXEI%253D&orig_cvip=true&rt=nc&_trksid=p2047675.l2557 (accessed 27 April 2013); Neatpieces, “Antique Miniature Meat Grinder Cast Iron Vintage Child’s Toy Salesman’s Sample,” EBAY auction ending April 17, 2013, http://www.ebay.com/itm/ANTIQUE-MINIATURE-MEAT-GRINDER-CAST-IRON-VINTAGE-CHILDS-TOY-SALESMANS-SAMPLE-/221212570274?pt=Vintage_Antique_Toys_US&hash=item33814bf2a2&nma=true&si=4hprmZEtWJ0Js7aL%252FNwXXiFYXEI%253D&orig_cvip=true&rt=nc&_trksid=p2047675.l2557 (accessed 27 April 2013); Sak335, “Vintage Salesman Sample Childs toy Kitchen Meat Grinder Chopper Marked AC,” Ebay auction ending March 24, 2013, http://www.ebay.com/itm/Vintage-Salesman-Sample-Childs-Toy-Kitchen-Meat-Grinder-Chopper-Marked-AC-/171009594085?pt=Vintage_Antique_Toys_US&hash=item27d0f752e5&nma=true&si=4hprmZEtWJ0Js7aL%252FNwXXiFYXEI%253D&orig_cvip=true&rt=nc&_trksid=p2047675.l2557 (accessed 27 April 2013); Sweetcheeks54lr, “Vintage Toy Miniature CA Meat Grinder Cast Iron Salesman Sample,” Ebay auction ending October 24, 2011, http://www.ebay.com/itm/VINTAGE-TOY-MINIATURE-CA-MEAT-GRINDER-CAST-IRON-SALESMAN-SAMPLE-/160667117688?nma=true&si=4hprmZEtWJ0Js7aL%252FNwXXiFYXEI%253D&orig_cvip=true&rt=nc&_trksid=p2047675.l2557 (accessed 27 April 2013).

¹² See Amazon.com examples cited above, ranging in price from \$22.99 to \$29.99.

¹³ See Roberts’ accession documents, Slosberg.

¹⁴ Letters between Rachel Wilson and GHS, Germantown Historical Society Accession 1995.15.

¹⁵ “707 W. Mount Airy Avenue, Philadelphia-West Mount Airy, PA 19119,” Blockshopper Web site, http://philly.blockshopper.com/property/092065200/707_w_mount_airy_avenue/ (accessed 19 April 2013); “707 W. Mount Airy Avenue in Philadelphia-West Mount Airy sold for \$780,000,” Blockshopper

Web site, July 31, 2007, http://philly.blockshopper.com/sales/cities/philadelphia-west_mount_airy/property/092065200/707_w_mount_airy_avenue/481764 (accessed 19 April 2013).

¹⁶ Slosberg, item 30.

¹⁷ Slosberg, items 30, 31, 34.

¹⁸ Prown, 1, 3, 4.

¹⁹ See Eun G. Park, "Understanding "Authenticity" in Records and Information Management: Analyzing Practitioner Constructs," *The American Archivist* Vol. 64, No. 2 (Fall/Winter 2001), <http://www.jstor.org/stable/40294173> (accessed 16 October 2011), 286-287, for discussion of how different information professionals evaluate records' authenticity. The survey groups archivists and record managers together, but results for the combined group sharply diverge sharply from the bibliographic slant of librarians. See Kate Theimer, "Archives in Context and as Context," *Journal of Digital Humanities* Vol. 1, No. 2 (Spring 2012), <http://journalofdigitalhumanities.org/1-2/archives-in-context-and-as-context-by-kate-theimer/> (accessed 29 March 2013) for discussion of archivists' professional practice and terminology in contrast to other constituencies, primarily digital humanists.

²⁰ Heather MacNeil, "Trusting Description: Authenticity, Accountability, and Archival Description Standards," *Journal of Archival Organization* 7, No. 3 (2009), 99, DOI: 10.1080/15332740903117693 (accessed 19 November 2011), quoting Laura Millar, "The Death of the Fonds and the Resurrection of Provenance: Archival Context in Space and Time," *Archivaria* 53 (Spring 2002), 12-13.

²¹ See Anita Sarkeesian, "LEGO & Gender Part 1: Lego Friends," *Feminist Frequency*, 30 January 2012, <http://www.feministfrequency.com/2012/01/lego-gender-part-1-lego-friends/> (accessed 25 January 2014) and "LEGO & Gender Part 2: The Boys Club," *Feminist Frequency*, 6 February 2012, <http://www.feministfrequency.com/2012/02/lego-gender-part-2-the-boys-club/> (accessed 25 January 2014) for the historical overview of Lego marketing and Todd Wasserman, "Lego's 1981 Girl-Power Ad Comes With an Inspiring Backstory," *Mashable*, 21 January 2014, <http://mashable.com/2014/01/21/lego-girl-power-ad-1981/> (accessed 25 January 2014) for the vintage ad gone viral.

²² Judith E. Owen Blakemore and Renee E. Centers, "Characteristics of Boys' and Girls' Toys," *Sex Roles* Vol. 53, No. 9/10 (November 2005), 619-633, DOI: 10.1007/s11199-005-7729-0 (accessed 26 April 2013).

²³ Karen Calvert, "Children in the House, 1890 to 1930," in Jessica H. Foy and Thomas J. Schlereth, eds., *American Home Life, 1880-1930: A Social History of Spaces and Services* (Knoxville, Tenn.: University of Tennessee Press, 1992), 85.

²⁴ Donna R. Braden, "'The Family That Plays Together Stays Together': Family Pastimes and Indoor Amusements, 1890-1930," in Jessica H. Foy and Thomas J. Schlereth, eds., *American Home Life, 1880-1930: A Social History of Spaces and Services* (Knoxville, Tenn.: University of Tennessee Press, 1992), 146, 148, 151. Braden quotes Mabel Travis Wood's introduction to *Family Fun: Games and Good Times for Children and Parents* (New York: Parents' Magazine Press, 1931), xii.

²⁵ Sarkeesian, "LEGO & Gender Part 2."

²⁶ Calvert, 87, 89.

²⁷ Cowan, 212.

²⁸ Cowan, 214-215, 218.

²⁹ Biographical info from “Rachel Wilson” file, Germantown Historical Society Accession 1995.15. Women’s names can pose an interesting challenge. I have chosen to refer to the meat grinder’s donor as “Rachel Wilson” rather than “Rachel Haines” or a less-wieldy configuration. As a child, she played with the meat grinder, but it was later, as an adult, that she took control of the preservation of her family’s history. I have defaulted to the name she used at that time. I have also used the married name of Wilson’s mother: she is relevant to my interests due to her connection to the Haines family, and she also engaged in activities in the public sphere using that name.

³⁰ “Rachel Wilson” file.

³¹ Joseph Haines to William Haines, 1 July 1918, Haverford College Library, Haverford, PA, Quaker Collection, Joseph H. Haines Papers, Coll. No. 950.

³² Joseph Haines to William Haines, 1 December 1918, 8 December 1918, JHH Papers.

³³ Joseph Haines to William Haines, 27 January 1918, 15 December 1918, JHH Papers.

³⁴ Cowan, 211.

³⁵ In one letter, written in response to the possibility of publishing his letters, Haines noted the routine nature of his correspondence and a disinclination to send his letters through Paris for an additional round of censorship. Self-censorship is implied; Haines felt “it is wiser to play entirely safe with the censor.” Joseph Haines to William Haines, 17 March 1918, JHH Papers.

³⁶ Joseph Haines to William Haines, 24 February 1918, 28 April 1918, JHH Papers.

³⁷ Joseph Haines to William Haines, 28 April 1918, JHH Papers.

³⁸ Joseph Haines to William Haines, 19 May 1918, JHH Papers.

³⁹ See for example Joseph Haines to William Haines, 4 January 1917, 2 January 1918, 9 February 1918, 17 February 1918, 24 February 1918, 22 December 1918, 29 December 1918, JHH Papers.

⁴⁰ Finding Aid, Haverford College Library, Haverford, PA, Quaker Collection, Margaret Mary Clark Haines Papers, Coll. No. 950.

⁴¹ Edith M. Backhouse to Margaret Mary Clark, 11 April 1916, 26 January 1917, MMCH Papers.

⁴² Taylor to Margaret Mary Clark, 20 January 1915, MMCH Papers.

⁴³ Accession 1995.15.53, GHS.

⁴⁴ Accessions 1995.15.2, 1995.15.3, 1995.15.6A, GHS.

⁴⁵ Accession 1995.15.34, GHS.

⁴⁶ Accessions 1995.15.19, 1995.14.45, GHS.

⁴⁷ Joseph Haines to William Haines, 17 March 1918, JHH Papers. It is of course possible that Haines simply wished to bypass the censor in Paris but still entertained the possibility of publication.

CHAPTER 5

DIGITIZATION AND MATERIALIZATION

In this chapter, I will discuss the process of digitizing and materializing the meat grinder. It is not my intent to prescribe a particular technical method for this process. The hardware and software I have chosen (discussed in more detail in Appendix B) are a means to an end and the passage of a year or two can alter the tools available. However, technological issues were factors in my decision making process, and my interaction with technology is properly considered as part of my analysis. It is for that reason that this chapter takes the form of a reflexive project narrative.

Digitization

Photography

I spent a portion of one day photographing the meat grinder. My primary goal was to create a set of photographs suitable for building a 3D model. My secondary goal was to compare the usefulness of the different photo sets. My third goal was to analyze how the process affected my engagement with the meat grinder. In short, I wanted to assess the feasibility of such a project and speculate upon its value as an intellectual exercise.

I shot using three devices in two locations. The technical specifications of my smart phone, Nikon, and iPad are discussed in Appendix B, but suffice to say that they are unexceptional digital photography options. The locations were Germantown Historical Society spaces which the staff was kind enough to offer for my purposes. They were not optimized for artifact photography. The ad hoc nature of the locations was, from

my perspective, a benefit. I have no doubt that a professional photographer, with high-end equipment and control over lighting and other environmental factors, could produce a fantastic set of images. I wanted to see if I, working in real world conditions and using the equipment I carry in my pocket, could produce an adequate set of images.

In order to build a 3D model, I needed a set of photographs documenting the meat grinder from all angles. (Except the bottom—a relative term defined with an eye toward the technical requirements of printing.) Online resources and publications such as *MAKE* offer instructions and advice for photographers. The object should remain stationary, with the photographer circling to capture a series of angles. Deep shadows and highly reflective surfaces are to be avoided, and natural lighting is preferred. Software stitches together the photographs by finding common reference points; the basic model can then be modified manually to compensate for less-than-perfect rendering. Technical and compositional expertise are not required.

My first location was the break room. I visited on a sunny day, and even with the blinds closed as tightly as possible the light from the window was bright. The table was oval. Had it been round, I would have had a convenient tool for gauging distance to the object, but instead I simply tended to lean in over the longer ends of the table. The tablecloth featured an orange paisley and flower pattern. I was offered a sheet of white paper as background, which I used for one set of photographs before deciding it was unnecessary.

I placed a fabric cutting mat under the meat grinder. Depending upon the angle of photographs, this could provided a largely uniform background of green, contrasting well with the meat grinder. More importantly, it provided a grid. Photographers who wish to

create 3D models are advised to create reference points—distinctive backdrops, newspapers, and sticky notes are variously suggested—and the cutting mat served the same function.¹ (See Photograph 3.)



Photograph 3. The Germantown Historical Society break room. Except where noted, all photographs of the meat grinder were taken in this location using the Nikon DSLR.

The second location was in the basement. The meat grinder was illuminated by artificial light from above. Once more, I used the cutting mat to provide reference points. The table upon which it sat was not clear of other artifacts, so from some angles I took blind shots. In this case, the iPad seemed a superior choice: I reached around to brace it on the table rather than hold it up to aim at the meat grinder, as I did with the LG and Nikon. I felt fairly confident that some of the break room photographs would work, so I

did not make any effort to bring in an uncluttered surface on which to photograph the meat grinder. (See Photograph 4.)

I took photographs with all three devices and took advantage of preview functions to broadly gauge the quality of my images. I sought to minimize reflection and deep shadows (a particular concern given the backlighting in the break room). In general, this meant eschewing the flash. (See Photograph 5.)

Digital photography means the expense of each shot is negligible. The only issue is storage capacity, and I had adequate space on each device, to say nothing of the storage available on my laptop. Because of this, experimentation was not only possible but encouraged. There was only the most marginal of costs—time, on a day I had already planned to spend at GHS—to taking additional sets of photographs from different angles or using different settings. The inexpensive nature of digital photography also encouraged a certain lack of care. I attempted to keep the camera about the same distance away from the meat grinder for all shots, but did not go so far as to measure the distance, much less employ a tripod. I did not trouble myself with research about, for instance, the Nikon’s range of settings. I could use “flower” for one set of photos and “P” for another, compare the previews, and see which set of images the modeling program preferred. Feedback was nearly instantaneous. Though I was not able to tell which set of photos would be most useful, a look at the previewed image allowed me to see which shots were poor quality. I had the option to delete images that were over- or underexposed, out of focus or cropped a portion of the meat grinder; or I could leave the pressing of the delete key until a later stage of the process. With greater constraints on the number of pictures or amount of time, I would have been encouraged to plan more carefully in advance.



Photograph 4. The Germantown Historical Society basement. Photograph taken with the LG smartphone.



Photograph 5. Photograph taken using flash, showing bright light from window and shadows on meat grinder.

The Nikon offered the greatest degree of control over images. I experimented with exposure settings and the use of the flash, though I tried only a few of the permutations available. An early round of images used the close up point-and-shoot mode (the flower icon); later I switched to programmed auto exposure mode (P). I did not use a Speedlight flash unit or attempt any reflective tricks, but instead only used the built-in flash. In my initial attempts to photograph the meat grinder, I was more or less on its level, which meant a number of shots had the window framing a significant portion of the artifact. Photographs taken at that angle benefited from the flash; the meat grinder was otherwise deeply shadowed. For my second full set of photographs, I aimed downward. This kept the mat as the immediate background of all parts of the meat grinder from all angles. (See Photograph 6.)



Photograph 6. Photograph taken aiming down to use the cutting mat as a backdrop.

When taking photographs with the LG, I continued to aim more or less downward. I did not attempt to insure that the mat was the exclusive background. In a number of pictures, the tablecloth pattern peeks through the screw's keyhole. (See Photograph 7.) I did not use the LG's flash (and in fact, almost never use it: in my experience with the smartphone, the risk of overexposure is much greater than the risk of underexposure, to say nothing of the distracting nature of the very bright LED). At the end of my "formal" photo shoot, I took several miscellaneous shots, including close ups, details, and different angles. In general, I felt less inhibition when taking pictures with the LG. I did not feel as though I was somehow violating the cohesion of my photo set by taking additional images. Despite the fact that Nikon pictures had the same cost as LG pictures—functionally nil—the Nikon strikes me as heftier. There is a large lens and user-adjustable settings that go well beyond "swap camera," zoom, and the rest of the LG's repertoire. The Nikon is literally weightier than my smartphone, and has the physical silhouette I associate with a "camera." Pictures taken on a phone automatically feel less formal, more disposable, and perhaps more appropriate for experimentation. My expectations are also lower. Despite the fact that I rarely use the LG to place a phone call, I still think of the device as intended primarily for telephonic and data communication. Its camera and video functions are a frequently-used bonus.²



Photograph 7. Photograph taken aiming down but with the tablecloth visible as a backdrop. Photograph taken with the LG smartphone.

I primarily use the iPad for streaming video content. I find aspects of the interface annoying, and have not had the occasion to use it extensively enough to overcome my initial frustrations. Physically, it is even less obviously a “camera” than the LG. Despite my comparative lack of experience with it, the iPad did feel like it had some advantages. Though it was the most unwieldy device when held aloft, I was able to rest it on the table and slide it around the meat grinder in a circular pattern. As a result, I felt as though I had more control over its position. The table provided some control over the z axis, and the sliding circle may also have compensated for the oval shape of the break room table and certainly made it easier to navigate the cluttered basement table. This control was partially an illusion, since I was still holding the device with my hand rather than a tripod, but having the table as an intermediary made me feel more secure, or at least less conscious of microshaking. Even if digital cameras can compensate for such motions, functioning as a sort of digital tripod, I am still conscious of their existence. (See Photograph 8.)

Ultimately, I chose to use a set of photos taken with the LG, as the initial model seemed to require less manual correction. One of the Nikon photo sets produced results that were nearly as good. I was therefore satisfied that, with minimal experience and relatively inexpensive, unspecialized equipment, a repository could undertake this kind of project.



Photograph 8. Meat grinder in the Germantown Historical Society basement. Photograph taken with the iPad.

The positioning of the meat grinder had technical and material culture implications. Printed objects require a flat base. The meat grinder lacks this feature: it was designed to be affixed to a counter using its screw. In a certain sense, the meat grinder is not quite a complete object without that counter. As I speculated on the possibility of materializing an absent meat grinder in Chapter 3, it is equally appropriate to consider the absent counter. The screw is a reminder of context lost in the transition from the original environment and into the repository. On a practical level, the meat grinder must stand (or lie) alone to be photographed, and exact replication of some surface area must be sacrificed for the printer's requirements. I chose to place the meat

grinder upside down, standing on the hopper, with the handle resting on the mat. This provided stability and minimal loss of external details. The interior, functional components were not going to be replicated in any case. This model was to fall firmly into the first approach (as described in Chapter 3) and treat the meat grinder as a static object. It is photographed and digitized as though it is a sculpture, so that it may be materialized as a sculpture.

The process of placement led to additional observations, retrospectively obvious things which I failed to note during my first analysis. Paper appears to be lodged in the mechanical workings of the meat grinder. (See Photograph 9.) The repository wrote the accession number on the object in ink. (See Photograph 10.) I honestly cannot remember if I failed to notice this when I first inspected the meat grinder, or whether this sort of curatorial notation has become transparent to me, after encountering and making a number of lightly-penciled notes on archived manuscripts.

These observations were encouraged by the digital photography session. After taking the photographs needed to build a model, I wished to take some from additional angles. The presence of the camera, and the aforementioned negligible additional expense (in terms of time, effort, and money), was an invitation to experiment. One piece of technology facilitated interaction with another object.



Photograph 9. Meat grinder, paper visible inside.



Photograph 10. Meat grinder, accession number visible.

Though I had already decided that I would adopt my first approach, and treat the meat grinder as a static object, I made small forays into approaching it as a mechanical object. I photographed the meat grinder from the angle I designated as the base, capturing an image of a portion of the auger. (See Photograph 11.) With curatorial permission, I removed the screw from the meat grinder. (See Photograph 12.) The artifact is in good condition—despite visible rust, the screw and handle function—so this partial disassembly was not particularly risky. Nor does it rise to the level of complete disassembly and reverse engineering suggested in my third approach in Chapter 3 above. But the removal of the screw, and photography of two separate pieces of the artifact, nonetheless seemed an interesting exercise.



Photograph 11. Meat grinder, view from below showing auger.



Photograph 12. Meat grinder without screw, paper visible inside.

Turning the screw for removal and, later, replacement, is the only time I have interacted with the meat grinder in anything close to the way its creators intended. The action is mundane; it is only upon reflection that I can find any significance, and this is itself perhaps strange. I cannot remember the last time I encountered a keyhole screw, though I am sure I must have done. I have tightened and loosened a number of screws in my life—but almost always with the use of a screwdriver. That hand tool is, in many ways, transparent. It mediates interaction with screws, but I do not typically think of myself as *using a screwdriver* so much as screwing a thing in place. *Finding* a screwdriver is a task that directly involves the tool: establishing whether I need a flat or Phillips head, lamenting that tools never seem to find their way back into the toolbox or pegboard. Repeated use of a screwdriver, as when I installed angle brackets for hanging

bookshelves, can leave me with sore, reddened palms. That physical discomfort, rather than the time expended on the manual task, sometimes prompts me to consider using a power drill. The occasional nature of my home improvement tasks and a certain wariness around power tools are, in combination, usually sufficient motivation to send me back to the manual screwdriver.³ It is often a completely unconscious decision.

The screw is a particularly interesting object from the perspective of 3D modeling and printing. Thingiverse hosts a number of printable screw patterns, some customized (like the fruit screw) and others pointedly standard.⁴ Screws are transparent in their own way. They are meant to hold things in place. Their absence can cause a noticeable problem, as can incorrect sizing or anchoring, but once they have been properly installed they are largely invisible. The printing of screws, and other components for DIY projects, is inherently non-sexy. It is only the process of production, and the excited discourse that often surrounds maker efforts in general and 3D printing in particular, which elevates the creation of hardware to an occasionally newsworthy hobby. Screw technology has been modestly refined since the 1920s: the aforementioned Phillips head was patented and mass produced in the 1930s and its comparative advantages discussed in *Popular Science*.⁵ The form and function of the meat grinder's screw is nonetheless quite familiar and feels decidedly functional rather than historically significant.

When taking the photographs of the disassembled meat grinder, I was careful to place both components alongside the cutting mat's ruler. I was somewhat surprised to find that this method of *recording* measurements did not feel as though I was *taking* measurements. Had I used a pair of calipers to measure the length of the screw—or even written down measurements taken using the mat's ruler—those numbers would somehow

seem more authentic than those derived from looking at the photograph. The reference image contained the information I could have recorded—and in fact, the photograph serves as a check against incorrectly recorded data—but consulting an image to record the data feels like an additional step and an opportunity to introduce errors. (See Photographs 13 and 14.)



Photograph 13. Meat grinder screw, alongside ruler.



Photograph 14. Meat grinder, alongside ruler.

My photography session was thus successful in ways beyond my initial goals. I was able to take photographs meeting the requirements for my modeling program. A variety of sets, taken with different equipment, allowed me to make broad comparisons and conclude that inexpensive and unspecialized equipment was adequate for a project of this type. I did become intellectually engaged with the meat grinder beyond the initial object analysis described in Chapter 4. But beyond that, I became engaged with other pieces of material culture: not merely the equipment I used in my photo shoot, but absent objects associated with the meat grinder and a selection of hardware and tools brought to mind by a screw. The creation of digital objects served as a useful catalyst for considering material objects.

3D Modeling

My initial aim was to use a single program to build and refine my model. As I progressed, it became clear that my software choice required supplementation (or more skill than I possessed), so in the end I used two programs: 123D Catch and Meshmixer. These both have the benefit of being free software with modest system requirements and sufficient documentation (official or user-generated) to learn quickly.

When using 123D Catch, I was at the mercy of connectivity. On one particular weekend, the online version consistently hung up without completing the creation of a project, and the few projects that were successfully created took hours to complete. The PC version was unable to launch—although it is a desktop application, it still requires a connection to Autodesk’s servers. Support forums were filled with complaints and the occasional individual pointing out that this sort of problem is par for the course when using the cloud. The latter comments are decidedly unhelpful and unwelcome when encountering such a problem, but before embarking upon a project it is wise to consider potential problems. The cloud is cheap, often convenient, and requires no institutional equipment or personnel overhead, but the advantages of outsourced technological solutions are countered by a lack of control over connectivity, specifications, security, and other factors. For the type of projects I propose—those which are neither mission-critical nor sensitive in nature—the trade off is worthwhile. The facilitator is, however, advised to have a backup plan in the case of technical problems. A session originally planned as model generation could perhaps be converted into historical research, or an investigation of the technical issues.

After that particular weekend, the cloud proved cooperative. Projects loaded quickly and the software was responsive. I generated models using various photosets and ultimately selected one created from a set of smartphone pictures, based on a guess of which model would require the least editing. I then proceeded to experiment with the software.

I tend to learn new programs by using them. I drew a bit on prior experience with such programs as Photoshop and, when necessary, consulted the video tutorials on the Web site or searched the Web for answers. 123D Catch is reasonably well documented. Meshmixer, infamously, is not. I found it a less intuitive program as well. I almost immediately ignored what official documentation existed and instead relied upon tutorials and forum responses posted by users. One could optimistically point to this as an example of the power of crowdsourcing, collaboration, and shared authority. More pessimistically, one could wonder if the lack of documentation bodes ill for support of the Meshmixer product.

A project facilitator would be advised to emphasize the former and turn a bug into a feature. Using Meshmixer encourages the user to explore others' work, experience, and expertise. This is valuable for three reasons. Learning-by-doing has the sort of pedagogical value discussed by Ratto (see Chapter 2). The research and collaboration skills that can be gained are useful in the academy, many workplaces, and life in general. And finally, it is this sort of interdisciplinary collaboration, crossing institutional boundaries and reaching into the institutionally unaffiliated software user base, that provides a microcosm for the practice and potential of public history.

123D Catch

I did several rounds of edits in 123D Catch, occasionally abandoning one model and starting over. Later iterations undertaken with more experience were accomplished more quickly and the results more satisfying. My primary concerns were cropping unnecessary material (primarily the cutting mat and tablecloth) and filling holes in the model. (See Figure 1.) To accomplish both tasks I relied upon cues from the physical object, drawn from my human interpretation of the photographs and my independent memory of the object they depicted. Color was a valuable cue, but not infallible: around certain borders, the model melded the form and color of the meat grinder and its environment. (See Figures 2 and 3.)

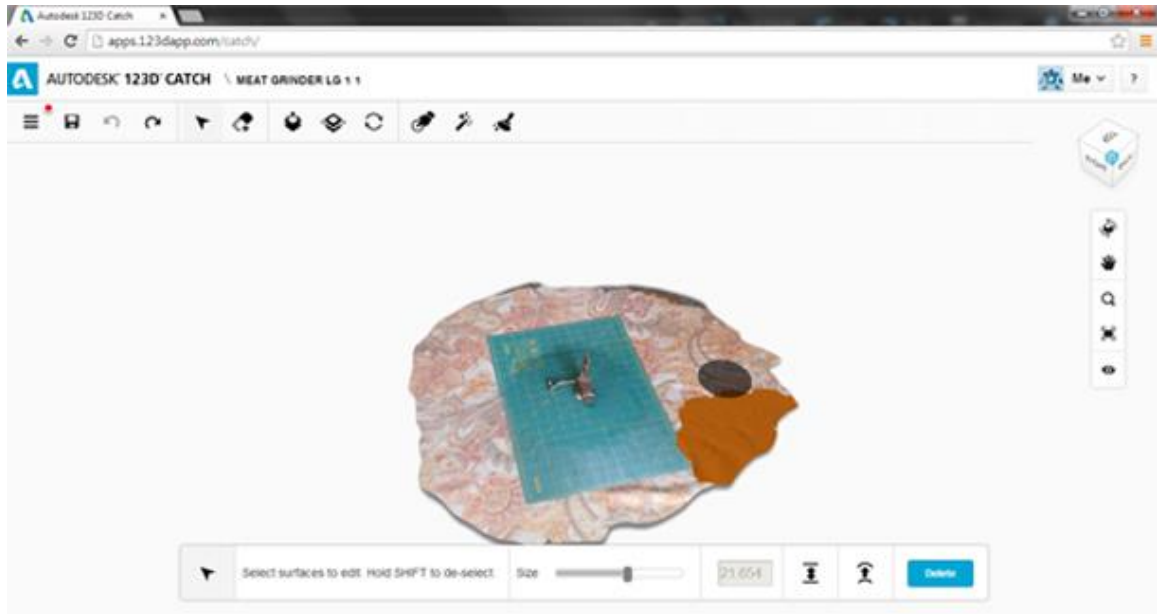


Figure 1. A model of the meat grinder and its environs, generated by 123D Catch, with areas selected for deletion.

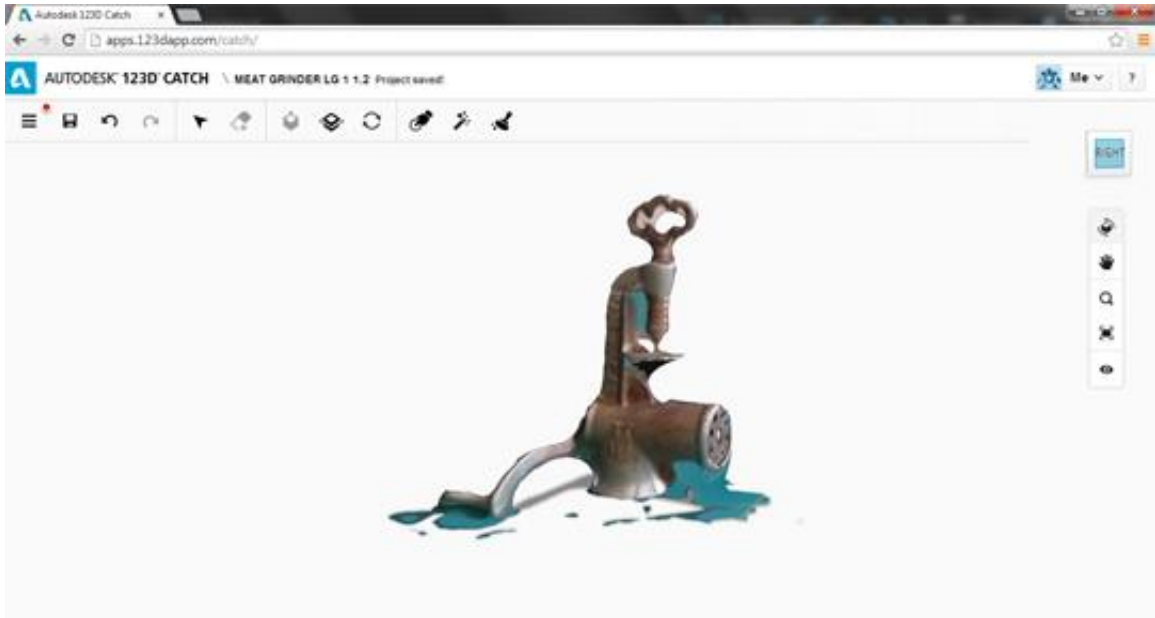


Figure 2. Meat grinder model with most excess material deleted, but some remaining interstitial cutting mat-colored material.

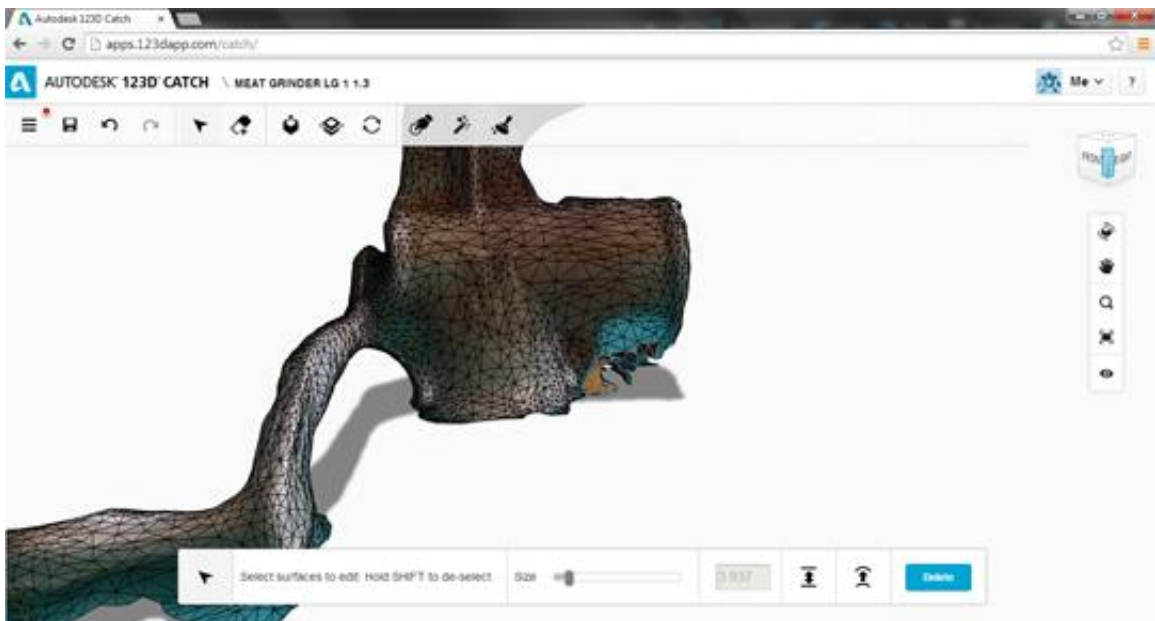


Figure 3. Meat grinder model, with mesh visible.

The mesh is only editable from certain angles, and it is not always immediately apparent when you are viewing a section from the wrong side (looking through a hole

into the interior of the object). (See Figure 4.) This means that rotation is necessary to do clean up work; it also means it is difficult to inadvertently punch holes in the model. Becoming accustomed to the selection mechanism was unexpectedly tricky. It is the sort of “brush” arrangement I have encountered in various other programs. It felt quick to void a selection, doing so when the center of the brush was in empty space, even if the edges of the brush highlighted part of the model. This behavior encouraged the use of smaller brushes, selecting smaller sections of mesh to put less work at risk, and more manipulation of the model’s angle and the zoom—in short, more care.

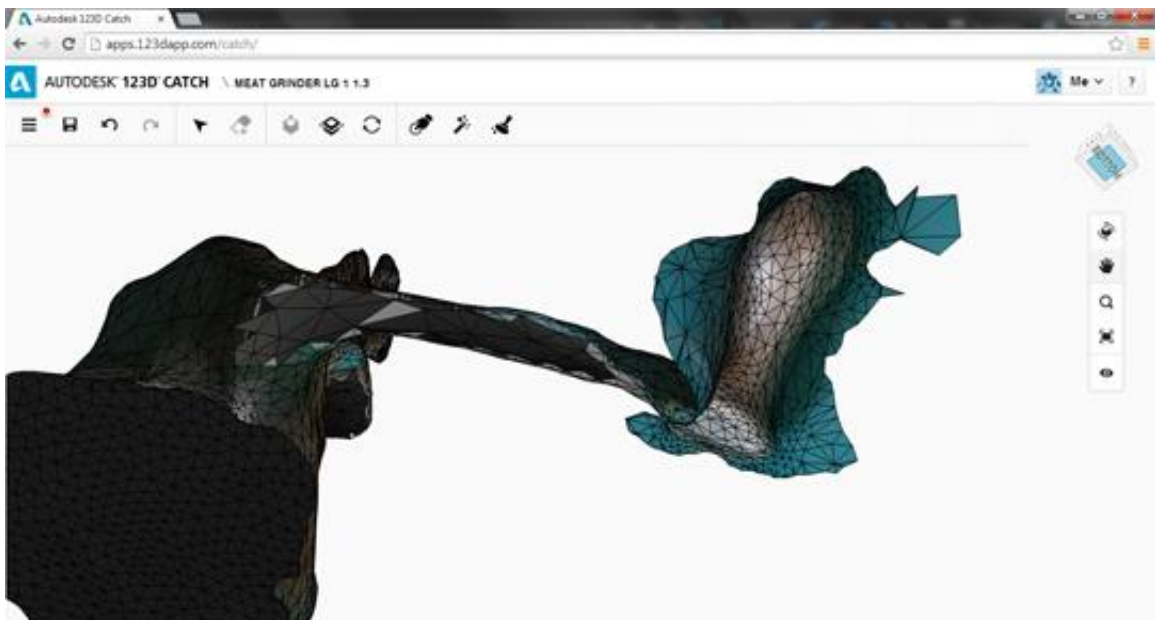


Figure 4. View of holes in the mesh, internal and external angles.

Some holes could be automatically detected and filled (“healed”). The manual fill tool is accessed by toggling the delete tool (an eraser icon), which struck me as counterintuitive. Certainly, creation and destruction are reasonable binary opposites. But I did not really think of my work as creation; I was tweaking. Substantial work generating

the model had been performed using a black box—I fed in one type of input (photographs), and without seeing the mechanism at work was presented with very different output (3D model)—and I had an extant object as a reference. The word “healed,” used in 123D Catch, also implies a return to a Platonic ideal (or at least an earlier state). Deleting jagged edges, and then filling open spaces, seemed parallel, related tasks. But the toggling between the two tools emphasized that the program neither knows nor cares about the nature of the model. It is sophisticated enough to build a model based upon photographs, but not sophisticated enough to ignore an orange paisley tablecloth. Once generated, the 3D model takes on a life separate from the photographs and the object depicted. My manipulations were no different than those of a person creating a completely original object freehand, without references to photographs or a physical object.

Meshmixer

I found 123D Catch an unsatisfying solution for filling some of the larger holes in my model, so I abandoned my original plan to confine myself to a single piece of software. I proceeded to experiment with Meshmixer, with the aforementioned poor documentation and counter-intuitive interface. After consulting user-generated tutorials I rotated the object and did a smooth autofill of the remaining holes.⁶ In subsequent edits I experimented with resizing the object along different axes. (See Figure 5.)

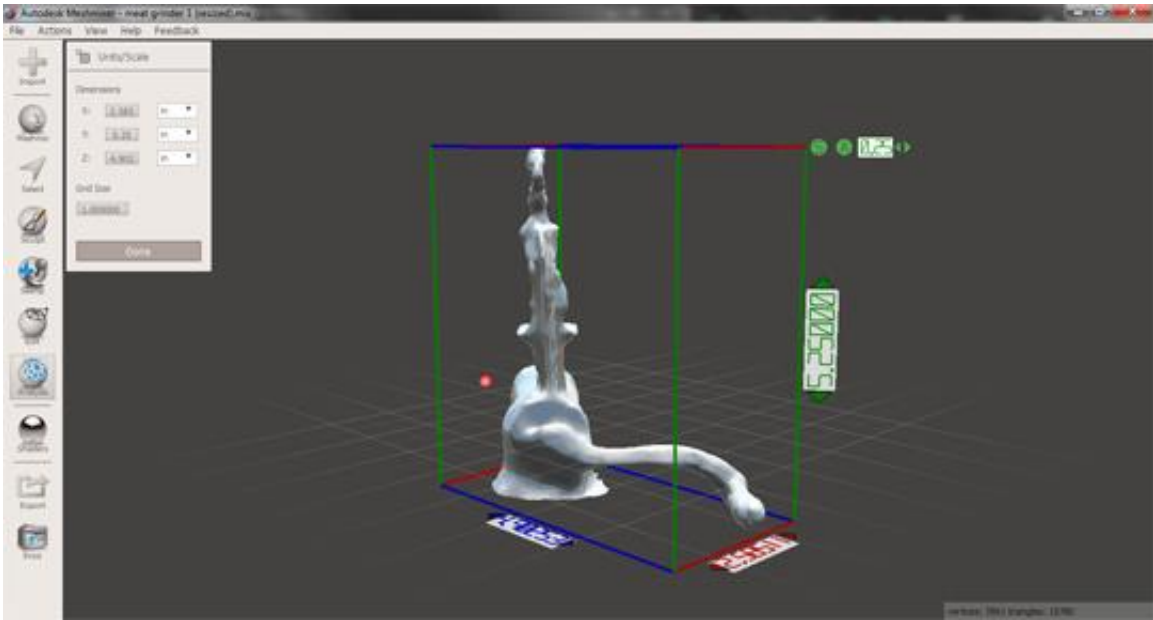


Figure 5. Meshmixer model displaying model measurements along various axes.

I also performed some unintentional transformations along the way—this was another case where the inexpensive, iterative nature of digital work allowed experimentation and largely eliminated the frustration of lost work. I was ultimately too careless about the autofill—it was effective in several cases, but also responsible for creating (or at least exacerbating) the “goiter” discussed in my analysis of the printed object (see Chapter 6). In general, I treated Meshmixer as a set of automated functions and 123D Catch as a means of making manual changes. This was partially due to my comfort level and willingness to engage with their respective interfaces, and partially due to their positions in my workflow. Tinkering happens early, but the latter Meshmixer stages I treated as more akin to exporting files—to the model’s detriment.

Meshmixer offers several tools that analyze a model’s suitability for materialization. The stability analysis provides a preview of how the object will sit when subjected to the forces of gravity, and the strength analysis provides warnings about weak

parts of the design. (See Figures 6 and 7, respectively.) Neither of these told me anything I did not know or guess, but they are still useful visualizations of the way the eventual physical object will interact with physical laws. They also serve as a reminder that the expected end point of the exercise is a printed object.

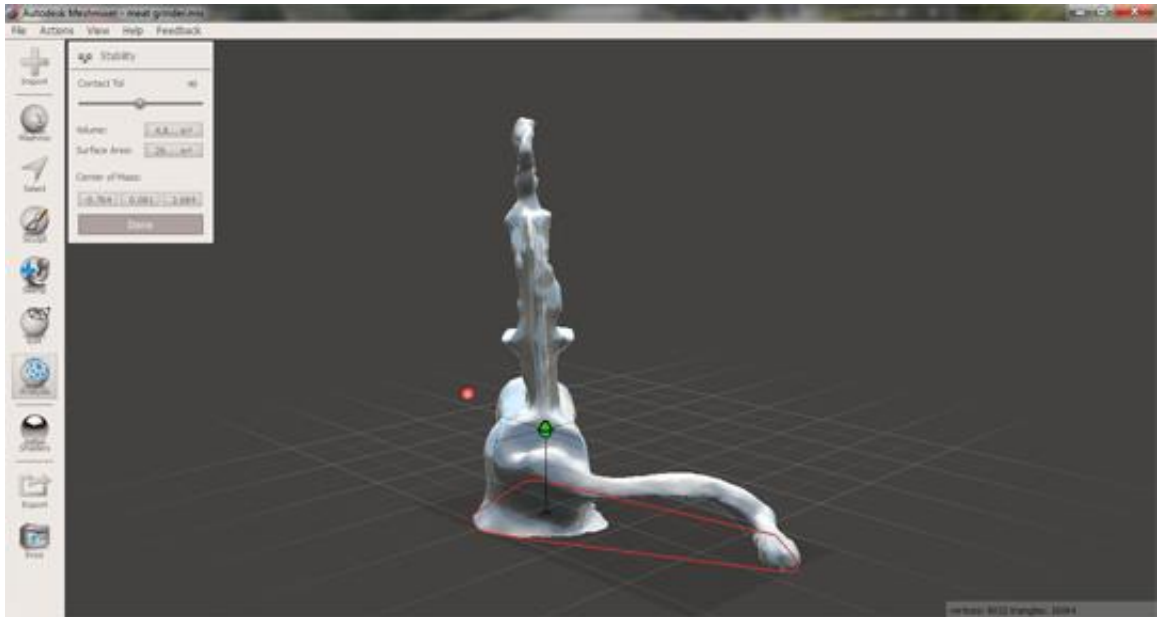


Figure 6. Stability analysis of model.

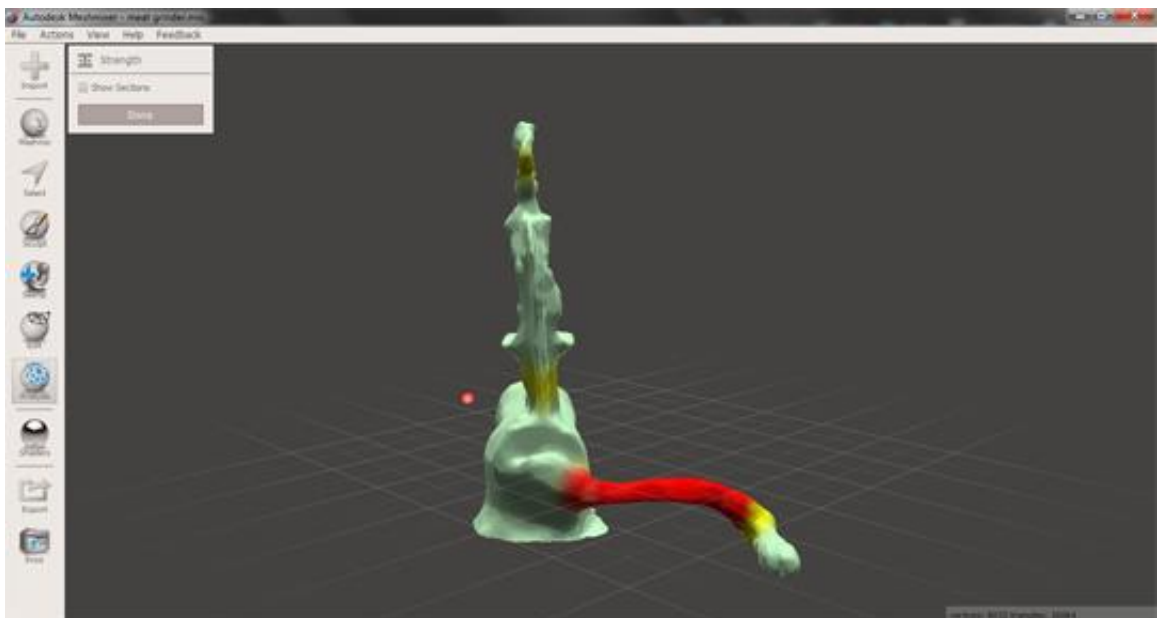


Figure 7. Strength analysis of model.

The most useful tool was the option to provide supports. These supports are added structural components which are ultimately intended to aid in the printing process and be removed thereafter. The arcing handle was, unsurprisingly, considered in need of support. (See Figure 8.) Meshmixer also includes an option to explore an optimized orientation, which in this case called for printing the meat grinder on its side, using rather a lot of supports. (See Figure 9.) From my lay perspective, this appeared less than optimal and I decided to take my chances with the original orientation. I ultimately opted to print without using the supports, but they provided another reminder that the 3D model was intended as an intermediate step in the process of creation rather than the end point.

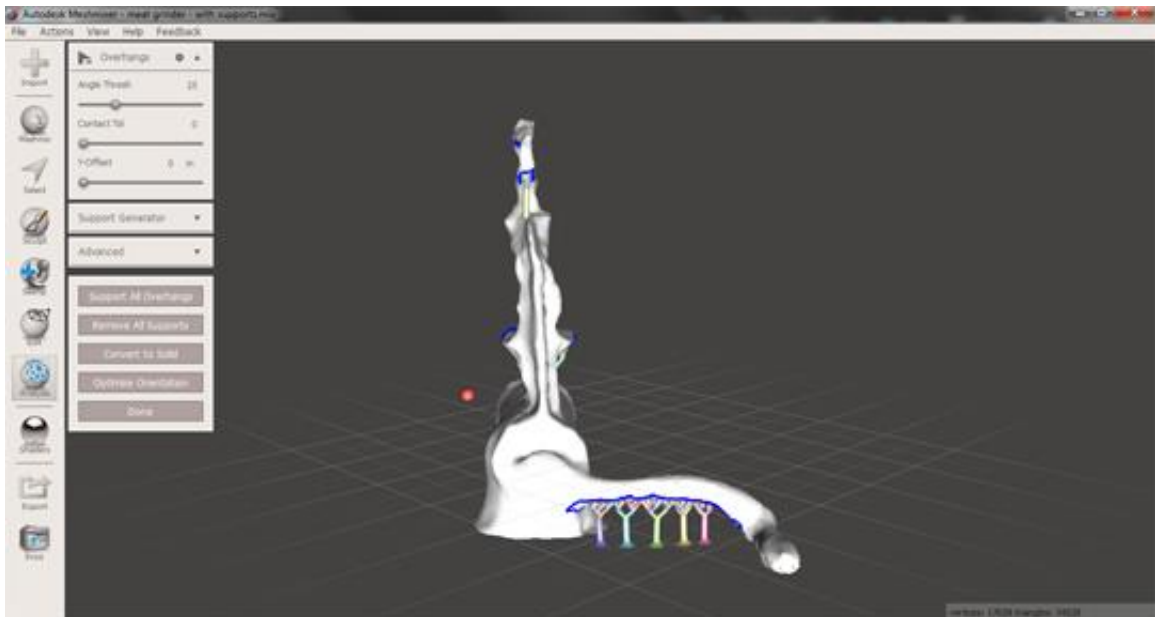


Figure 8. Meshmixer model with proposed supports to the handle.

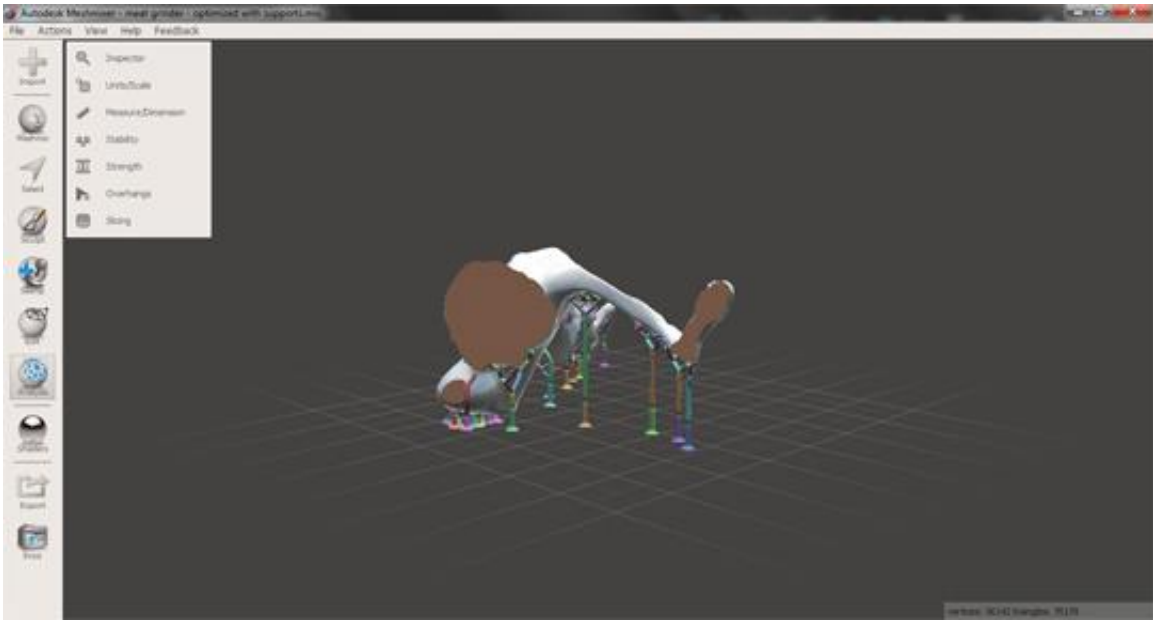


Figure 9. Meshmixer's optimized orientation and support of the model.

The supports served me well as a purely digital tool. Generating supports also proved to be a quick way to confirm the alignment of the model. They were a shortcut, allowing me to work with more confidence in a program that was not terribly intuitive or familiar. In 123D Catch, I had performed a plane cut: excising material from the bottom of the model to provide a flat base. That was evidently less than effective, because Meshmixer initially supported the entire bottom of the model on tiny legs. I performed another plane cut in Meshmixer, after consulting a forum post for guidance, and this time the procedure proved effective.

Materialization

Printing

I chose to use Shapeways as a printing service. When I uploaded my life-sized 3D model, I was a little surprised to see a price of \$114.65. For all my interest in material

culture, the physical implications of working in three dimensions are not second nature when embarking upon what in many ways felt like an art project. Dimensions were merely numbers to the modeling software, and most of my non-virtual artistic endeavors have been firmly two dimensional (charcoal or pen and ink drawings) in which materials are an overhead rather than strongly variable cost. Small=cheap had been part of my calculus when selecting an object, but had not been such an overriding concern that I felt the need to calculate volume earlier in the process.

Instead of printing the object at full size, I opted to scale it down. I chose a height of 2” somewhat randomly (it’s a nice, round number) and, upon uploading the new model to Shapeways, was given a quote of \$7.66. After factoring in shipping costs, the price of the printed object was be roughly equivalent to the market value of the meat grinder. Had I wished to spend more time scaling to a wider variety of sizes, I could have hit the market value more precisely, but the value of that exercise is so negligible that I cannot really count it a missed opportunity.

This price was much more acceptable, especially because this initial print was a trial run. I suspected my model was printable, but was not entirely confident. I was printing it upright (as opposed to the “optimized” orientation calculated in Meshmixer) and without supports. In theory, Shapeways reviews the printability of models, but I did not discount the possibility that I would receive a semi-differentiated lump or an object so fragile that the handle might snap the first time I touched it. Even a failure would be useful for purposes of analysis, but I was hoping for a print which was successful on its face: one that materialized a 3D model without falling to pieces.

Because I used a printing service, the materialization process was neither immediate nor interactive. I suspect my reaction to the fabricated object would have been different if I had watched a printer extrude layers of plastic, and different still if I were responsible for operating or building that printer. Instead, my experience with Shapeways, like the initial uploading of the photographs, was something of a black box: I provided input and received a transformed output.

¹ See for example “Learn how to use 123d Catch,” Autodesk 123D Web site, <http://www.123dapp.com/howto/catch> (accessed 6 May 2014).

² A clickbait review of the Moto X, written in verse, expresses my feelings about the LG: “The Moto X has a camera./The pictures look fine./Not like a big camera./But good.” John Herman, “The Amazing True Story Of The Moto X,” BuzzFeed Web site, August 1, 2013, <http://www.buzzfeed.com/jwherrman/the-amazing-true-story-of-the-moto-x> (accessed 9 May 2014).

³ I can trace my skittishness towards power tools directly to the elevator scene in *Godzilla 1985*, a point which is relevant because I suspect it makes me more likely to default to manual tools than might otherwise be expected, and because it illustrates the unexpected ways in which individuals can internalize the media they consume.

⁴ See for example Henrik Larsen, MScrew generator, Thingiverse, March 2, 2013, <http://www.thingiverse.com/thing:56492> (accessed 15 February 2014); pek4test, Screw Test Set, Thingiverse, February 21, 2013, <http://www.thingiverse.com/thing:52656> (accessed 15 February 2014); Marc Raiser, Fruit Screw, Thingiverse, August 8, 2013, <http://www.thingiverse.com/thing:129874> (accessed 15 February 2014).

⁵ “Cross-shaped slots help guide screws,” *Popular Science* Vol. 128, No. 1 (January 1936), 38, <http://books.google.com/books?id=eyYDAAAAMBAJ> (accessed 3 May 2014); Timeline, Phillips Screw Company Web site, <http://www.phillips-screw.com/timeline.php> (accessed 3 May 2014).

⁶ Simon J. Oliver’s blog entry provided a good starting point. “Meshmixer 2.0: Best Newcomer in a Supporting Role?” Extrudable.Me, December 28, 2013, <http://www.extrudable.me/2013/12/28/meshmixer-2-0-best-newcomer-in-a-supporting-role/> (accessed 11 July 2014).

CHAPTER 6

MEGAN MILLER'S MODEL

Previously chapters, particularly 4 and 5, are inextricably linked to this object analysis. When I interact with the three-dimensional plastic object, I am in fact operating in four dimensions: I remember the period when this object did not exist, when I was involved in the process of its creation, and when I was interacting with the metal meat grinder. Object analysis (or any other sort of analysis) does not happen in a vacuum, and my involvement in the creation of this object underlines the subjectivity of the enterprise.

Object Analysis

The object is lightweight, made of rough white plastic, and two inches in height. It sits upright on a flat, irregularly ovoid base, with the terminus of an arching arm for support. It is stable, though the vertical elements list slightly to one side. Some horizontal striation is visible. The horizontal surface halfway up is covered with a whorling pattern reminiscent of fingerprints or an elevation map. A vertical protuberance, nearly touching the horizontal surface, appears broken at first inspection, but merely jagged upon closer examination. The top section is recognizably a key-shape, but irregular in thickness and general execution. A rounded protuberance—which I dubbed a goiter due to its organic appearance—extends downward from a drum shape with shallow depressions. It is a single, solid object without moving parts. (See Photographs 15, 16, 17, and 18.)



Photograph 15. Printed meat grinder, angle similar to the photoset used for model generation. The photographs of the printed model were all taken outside on my front porch using the Nikon DSLR.



Photograph 16. Printed meat grinder, view of hand crank.



Photograph 17. Printed meat grinder, view of goiter and drum depressions.



Photograph 18. Printed meat grinder, view of whorls and gritty texture.

The form is eclectic. Some portions hint at orthogonal precision, while others are decidedly organic in appearance. Or, less charitably, melted: the fact that the object is plastic, rather than a material with a higher melting point, brings this interpretation to mind. Melting plastic is a known risk in a normal household environment. I have inadvertently reformed plastic spoons while cooking, and suspect it is only a matter of time before one toy or another finds itself fused to the bottom of the toaster oven. The melting point of this particular plastic is in the mid-300s F (right around cake-baking temperature) and it will begin to soften at slightly lower temperatures (cookie baking temperatures).¹ Had the object been metallic, the rounded shapes might have implied longevity and wear. Of course, the texture of the object argues against the material being melted or worn, but my prior experience with materials almost unconsciously informs the similes I use.

Though the design varies, none of those differences could be classified as a decorative motif or ornament, thus leaving an impression of a functional object that has no discernible function. There are no markings—letters, numbers, or symbols—to provide information about the object’s creation and purpose. Guessing the intended

function of the tool it represents would be difficult: it is smaller than even the toy meat grinder, and it is frozen in place upside down, without the movement of the crank or any hint of internal mechanisms. The object is definitely more sculpture than kitchen tool or toy. In Prown's hierarchy, it is a category one object based upon a category two object, which was itself based upon a category six object.²

The provenance of the object is well-known and documented. The creation of the 3D model commenced on February 10, 2014, when I photographed the metal meat grinder at the Germantown Historical Society. At various points in March, April, and May I played with 123D Catch and, at the end of May, I exported a model to Meshmixer and made a final round of edits before submitting it for printing. It was fabricated by Shapeways some time between May 31 and June 6, 2014—the dates I uploaded the 3D model and received notification that the object had shipped, respectively.

Precise measurements are calculated by Shapeways: the object measures 1.016 x 2 x 1.926 inches and is comprised of a total of 4.4020 cubic centimeters of material. The material is “Strong & Flexible” plastic, described as “white nylon plastic with a matte finish and slight grainy feel.” The Material Safety Data Sheet is more specific, identifying the material as Fine Polyamide PA 2200, supplied by Bavarian-based EOS GmbH - Electro Optical Systems. The MSDS also notes a lack of known toxicological dangers, but warns against inhaling dust and notes that the dust can form a potentially explosive mixture with the air.³

Observations about the object yield more information when considering the form of Rachel Wilson's meat grinder and the process of modeling and printing. The ridges along the vertical piece give a hint of where “Made in the U.S.A.” appears on one side of

the meat grinder. The horizontal striations are an artifact of how the material was laid down during printing. The whorls are probably a result of my efforts to heal and smooth holes in the 3D model, making the comparison to an elevation map especially apt. The model's listing appearance is expected, as it was present in the initial renderings from the photoset and I made no effort to straighten the model. The jagged appearance of the screw and base, as well as the lopsidedness of the top of the screw, are more a testament to my amateur modeling efforts than any limitations of the printing process. The goiter is the greatest such indication, both in absolute size and deviation from the appearance of the metal meat grinder. The choice of material, including color and texture, were chosen to minimize cost, as were the final dimensions. The context of creation does much to explain irregular or dissonant elements of the design.

Atypical Analysis

Traditionally, material culture studies—and object analysis methodology in specific—are used to fill in blanks.⁴ By creatively piecing together information from a variety of sources, we can speculate upon human/object interactions that may not be directly addressed in written records. In this case, some of that creativity at first appears absent: speculation is unnecessary when I am in possession of a 3D model, Shapeways invoice, and thesis prospectus. Two important points justify the object analysis: the printed object should not be viewed independent of the context of its creation; and however much we already know, a close examination of objects can always reveal additional insights into the object or the humans who create, use, or analyze it.

Originality and subjective reactions are issues which are explicitly addressed by the analysis of the printed meat grinder.

My analysis of the meat grinder upends aspects of Prown's methodology. The initial phases of investigation are designed to minimize "distorting biases"—Prown was concerned about the investigator's cultural perspective, but my highly individual perspective also distorts.⁵ A different investigator would not introduce those particular distortions. The extreme nature of this example forces a confrontation with the concept of a minimally- or unbiased investigator. Does such an individual exist? And would their analysis be useful? Objects are, after all, created by humans for human purposes. Investigators use human senses and research techniques to discuss human creations and interactions, for presentation to a human audience. That audience is initially comprised of temporal and cultural contemporaries, but over time the analysis will become a historical document, read by individuals increasingly removed from the writer by time and culture. The analysis of the object becomes not merely a record of the object, but a record of the investigation itself, and the investigator becomes part of the story of the object.⁶ By investigating an object whose story I already belong to, I am merely hastening this process.

Originality

The printed object cannot be divorced from the original object. The plastic rendering inherits something from the metallic original: aside from physical attributes, there is the fact that the meat grinder was preserved because it was significant (and gained significance through its preservation). Without the original, there could be no

printed object. The knowledge of how the printed object came to exist compels the examination of the original.

The printed model compels examination of the original, but also compels the examination of the concept of originality. When dealing with digital objects, references to an “original” are meaningless. Even when there is a nod to the cultural importance of the concept of an original, copies are held to be “identical and indistinguishable” from it.⁷ Completeness of meaning and replicability are all-important.⁸ The printed meat grinder is an incredibly interesting hybrid object. There is an original, physical artifact. There is an intermediate digital model. And there is the final printed object. The plastic meat grinder is quite different from the metal meat grinder (and, for that matter, the 3D model), neither “identical” nor “indistinguishable.” The concept of an original—of distinct iterations which much be assessed independently—is practically applicable. An object analysis of a plastic object is as legitimate as the analysis of a metal object. Its existence justifies the exercise.

We should not ignore the fact that the 3D model can be used to print a second plastic meat grinder to the same specifications as the first. The .obj file uploaded to the Shapeways server is identical to the one on my laptop, and the same material could be used to fabricate duplicate models—just as the metallic siblings of the meat grinder can be purchased on eBay. Uniqueness was not an attribute of the original meat grinder and is not an attribute of the plastic model. The metal meat grinder was meant to distill the important features of a kitchen tool, and transmit certain information and expectations to a young audience. The digital files and plastic model are my distillation of which aspects of the meat grinder are meaningful.

The plastic model strikes me as a very good physical representation of the 3D model, less so the original object. The idea that each iteration should induce loss is not surprising.⁹ But it is not only loss which is introduced. Visually, the plastic object looks less like the metal meat grinder than the pictures; but unlike the images, the plastic object also exists in three dimensions. The whorls on the plastic object are unexpected and call attention to a part of the technical process. Digitization and materialization encourage interaction with the original object, but also the intermediate digital and final physical object.

On a broad level, the photographs, digital files, and printed model are the result of my choices about which aspects of the meat grinder were essential to digitize and materialize. As noted in Chapter 3, those choices can be influenced by practical concerns or the type of question one wishes to ask of an object. The photographs and files generated by 123D Catch and Meshmixer are necessary intermediaries between the metal and the plastic objects. But they alone cannot exactly reproduce or represent the plastic meat grinder. They are evidence of the original and the process of the printout's creation, both archival description and records. They attest to a conscious process, a series of decisions. A small plastic copy of the meat grinder did not simply appear without effort or intent; nor did the metal meat grinder come into existence—or into Rachel Wilson's childhood home or into the Germantown Historical Society—independent of human will.

Emotion

The fact that I created the object might initially seem to make deduction and speculation unnecessary or irrelevant. There are, apparently, few blanks to be filled in:

the specifics of the object's creation, including the creator's intent, is known; while they may be recorded, they need not be researched or speculated upon. Object analysis is, however, a flexible and reflexive process. The amount of information known simply permits more confidence in assertions, a solid foundation upon which to take additional steps. Object analysis is subjective, and the fact that I am well-acquainted with the creation of the object means that my subjective responses attached to the object before it even existed. "Meeting" the object was a significant encounter, but not the first. That divergence from typical object analysis provides an opportunity to consider not just the object's "life" but the time before it existed, and focus upon the ways in which a particular perspective shapes our understanding of an object and its relationship with people.

My emotional response in particular cannot be easily separated from the process of creation. There is definitely evidence of the IKEA effect: I am pleased that I was able to translate photographs into a physical object. I have written thousands of words about what is, ultimately, a malformed plastic tchotchke with limited functional or aesthetic appeal. I am also disappointed. I was not expecting to make a shockingly precise replica of Rachel Wilson's meat grinder, but as often happens when trying something new I had secret hopes of discovering a prodigious talent. Evidence that my skills with 3D modeling software do not approach the magical is upsetting to my inner six-year-old, who has still not forgiven my failings at dancing, skiing, and karate. Even the more pragmatic adult is particularly annoyed by the goiter, because it is the result of inadequately reviewed work at the end of the process—or, less charitably but more accurately, the result of impatience and carelessness. My emotional response to the process—to my work (a verb)—

overshadow the response to the work (a noun) and render the object itself almost incidental. This is not the way object analysis typically operates, but I feel it serves as a useful reminder of the subjectivity baked into the process. The self-centeredness of this analysis is an extreme example, but also provides an opportunity to highlight the way in which subjectivity and self-awareness can influence the process.

Prown's methodology encourages a careful, reflexive, and respectful approach to objects and their context. These values can be applied even when an investigator is intimately connected to an object, as is the case with the printed meat grinder. As the creator of the analyzed object, I am well-positioned to know the answer to basic questions surrounding its material composition. More importantly, my relationship with the object—from conception through creation, and only later “meeting” the plastic model—provides a perspective not typically explored in object analysis.

¹ “PA 2200 Material data sheet,” EOS GmbH - Electro Opto Systems, 2008, http://www.shapeways.com/rrstatic/material_docs/mds-strongflex.pdf (accessed 29 June 2014), 2. For delicious reference, my go-to cake and cookie recipes are the “perfectly chocolate” cake recipe printed on Hershey's cocoa and a reverse-engineering of the cookies served at the Max & Erma's restaurant chain. Rita Nader Heikenfeld, "Like Max and Erma's Chocolate Chip Cookie Recipe," AboutEating.com, <http://abouteating.com/max-and-ermas-chocolate-chip-cookie-recipe/> (accessed 29 June 2014); "Hershey's "Perfectly Chocolate" Chocolate Cake Recipe," Hershey's Kitchens, https://www.hersheys.com/recipes/recipe-details.aspx?utm_source=redirect&utm_medium=redirect&utm_campaign=Redirect-recipes%20%28asp%29&id=184 (accessed 29 June 2014).

² Jules David Prown, “Mind in Matter: An Introduction to Material Culture Theory and Method,” *Winterthur Portfolio* Vol. 17, No. 1 (Spring 1982), <http://www.jstor.org/stable/1180761> (accessed 23 August 2012), 3.

³ “Fine Polyamide PA 2200 Safety data sheet,” EOS GmbH - Electro Opto Systems, 2005, http://www.shapeways.com/rrstatic/material_docs/msds-strongflex.pdf (accessed 29 June 2014); “Meat Grinder - No Supports - Reduced Size – Ascii,” Shapeways model page, <https://www.shapeways.com/model/upload-and-buy/2023050> (accessed 29 June 2014); “Strong & Flexible Plastic Material Information,” Shapeways, <https://www.shapeways.com/materials/strong-and-flexible-plastic> (accessed 27 June 2014).

⁴ See for example James Deetz, *In Small Things Forgotten: An Archaeology of Early American Life* (New York: Anchor Books, 1996).

⁵ Prown, 7. Prown is under no illusion that unbiased investigators exist or that strict sequencing is possible. His primary concern is not prescriptiveness, but a mindful approach to the process: "Vigilance, not martial law, is the appropriate attitude." Prown, 9.

⁶ Prown addresses the way an investigator might react differently to an object encountered at a later point in their lives; despite the particular nature of the encounter, both object and investigator maintain a "recognizable relationship" to their past identities. Prown, 8-9.

⁷ See Sharon Adam, "Preserving authenticity in the digital age," *Library Hi Tech* Vol. 28, No. 4 (2010), DOI: 10.1108/07378831011096259.597 (accessed 22 November 2011), 597, quoting Lynch, "The integrity of digital information: mechanics and definitional issues," *Journal of the American Society for Information Science* Vol. 45 No. 10, 737-44; Jeff Rothenberg, "Preserving Authentic Digital Information," in *Authenticity in a Digital Environment* (Washington, DC: Council on Library and Information Resources, 2000), <http://www.clir.org> (accessed 1 November 2011), 66.

⁸ See for example Michael Factor, Ealan Henis, Dalit Naor, Simona Rabinovici-Cohen, Petra Reshef, Shahar Ronen, Giovanni Michetti, and Maria Guercio, "Authenticity and Provenance in Long Term Digital Preservation: Modeling and Implementation in Preservation Aware Storage," TaPP '09: First Workshop on the Theory and Practice of Provenance. San Francisco, Calif., 23 February 2009, Accessed 2 November 2011. http://www.usenix.org/event/tapp09/tech/full_papers/factor/factor.pdf (accessed 2 November 2011), 2; Mahnaz Ghaznavi, "Standards for Digital Archives," Society of American Archivists, Continuing Education Webinar, Digital Archives Specialist Curriculum, September 29, 2011.; Anne J. Gilliland-Swetland, "Testing Our Truths: Delineating the Parameters of the Authentic Archival Electronic Record," *The American Archivist* Vol. 65, No. 2 (Fall/Winter 2002), <http://www.jstor.org/stable/40294206> (accessed 16 October 2011), 198n4; David M. Levy, "Where's Waldo? Reflections on Copies and Authenticity in a Digital Environment," in *Authenticity in a Digital Environment*, 25.

⁹ Adam, "Preserving authenticity," 597; Geoffrey Yeo, "Concepts of Record (1): Evidence, Information, and Persistent Representations," *The American Archivist* Vol. 70, No. 2 (Fall/Winter 2007), <http://www.jstor.org/stable/40294573> (accessed 16 October 2011), 341. Adam discusses the technical risks that are part of data migration, whereas Yeo's exploration of lossiness is broad enough to consider not only copying but also such processes as archival description.

CHAPTER 7

CONCLUSION

My project drew upon material culture, digital humanities, and archival theory and method in the service of public history investigations. After selecting an artifact and performing object analysis, I digitized and materialized a new object. I performed another object analysis on the 3D printed object.

The exercise began by provided the familiar benefits of object analysis: both the opportunity to closely research a particular artifact and to broaden the investigation to the artifact's historical context. In this case, a toy meat grinder provided an entry point to talking about general topics in the social history of the United States: domestic life, the role of women, the meaning of toys, shifting labor patterns, and the impact of technology upon daily life. This particular toy meat grinder also served as a means to discuss a specific Germantown Quaker family, their actions and possessions, and the various means by which their history was preserved and transmitted by artifacts and archives.

The digitization and materialization component of the project offered new ways to engage with an artifact. Object analysis was turned on its head as I investigated an object which I had a role in creating. This provided valuable insights into the artifact and new model, but also into the process of object analysis.

I have proposed approaches for performing similar investigations in repositories, along with a pedagogical argument for doing so. By emphasizing modularity, flexibility, and minimal capital requirements, I hope these approaches can be adapted to a variety of institutions and audiences. Researchers will reap the benefits of intellectual and

emotional engagement, hands-on learning, and technological experimentation. Public historians will have the opportunity to engage in outreach and innovative education and exploration of their collections.

The myriad professions falling under the umbrella term of “public historian”—including archivists, curators, and educators—can all benefit from self-reflexive examination of theory, method, and perspectives. The better we understand our collections, the better we can assist researchers in using them. Expertise in subjects and methodology can allow for a greater degree of collaboration. Well-informed public historians can proactively suggest lines of research or produce their own scholarship: articles for an academic, professional, or popular audiences, or less traditional scholarly works, such as material presented online. Historians working outside of the academy may have greater flexibility in the genre of work they can produce. A lopsided plastic meat grinder with a goiter would probably not impress a tenure committee, but it could serve as an excellent capstone for a series of educational sessions outside the classroom.

Utilizing new—or newly accessible—technologies is a useful strategy. Hands-on learning has pedagogical value, increasing student engagement and imparting new technical skills. Deploying technology in the service of historical investigation may also help raise the profile of institutions often dismissed as “dusty” or otherwise backward or dull. Focused, small-scale projects, especially if undertaken in collaboration with educators, have the potential to be flexible but completable. The project deliverable is a *thing*, digital or plastic, produced by the student’s effort. The teaching goals range wider, encompassing material culture, historical research, technological proficiency, and creative problem solving.

It is not enough for public historians to care about history. The enterprise is founded upon the premise that a broader audience should also care about history, and has something to contribute to the process of constructing histories. It is our job to foster the passion and confidence that are a necessary part of that process. What better way than inviting the public into our inner sanctum and encouraging them to play with our sacred objects? They belong to the public, after all; we merely hold them in trust.

BIBLIOGRAPHY

- “707 W. Mount Airy Avenue, Philadelphia-West Mount Airy, PA 19119.” Blockshopper Web site.
http://philly.blockshopper.com/property/092065200/707_w_mount_airy_avenue/
(accessed 19 April 2013).
- “707 W. Mount Airy Avenue in Philadelphia-West Mount Airy sold for \$780,000.” Blockshopper Web site. July 31, 2007.
http://philly.blockshopper.com/sales/cities/philadelphia-west_mount_airy/property/092065200/707_w_mount_airy_avenue/481764
(accessed 19 April 2013).
- Adam, Sharon. "Preserving authenticity in the digital age." *Library Hi Tech* Vol. 28, No. 4 (2010): 595-604. DOI: 10.1108/07378831011096259 (accessed 22 November 2011).
- Assell, Jean. "Quiet, Please!" Getty Images. Image #157428768.
<http://www.gettyimages.com/detail/photo/quiet-please-royalty-free-image/157428768> (accessed 16 February 2014).
- Association of Canadian Archivists. "Guidelines for the development of a two-year curriculum for a Master of Archival Studies." 1990.
http://archivists.ca/sites/default/files/Attachments/Communications_attachments/misc/guidelines_mas_web.pdf (accessed 23 December 2012).
- Atkins, Lance. "Inherently Useful: A 3D Printed Collection." Kickstarter campaign page.
<http://www.kickstarter.com/projects/lanceiscool/inherently-useful-a-3d-printed-collection> (accessed 1 July 2013).
- Autodesk 123D. <http://www.123dapp.com/catch> (accessed 10 July 2014).
- Beckett, Shawn. Personal conversation, 13 September 2013.
- Blakemore, Judith E. Owen and Renee E. Centers. "Characteristics of Boys' and Girls' Toys." *Sex Roles* Vol. 53, No. 9/10 (November 2005): 619-633. DOI: 10.1007/s11199-005-7729-0 (accessed 26 April 2013).
- Braden, Donna R. "“The Family That Plays Together Stays Together”: Family Pastimes and Indoor Amusements, 1890-1930." In *American Home Life, 1880-1930: A Social History of Spaces and Services*, edited by Jessica H. Foy and Thomas J. Schlereth, 145-161. Knoxville, Tenn.: University of Tennessee Press, 1992.

- Bruggeman, Seth C. *Here, George Washington Was Born*. Athens, Ga.: The University of Georgia Press, 2008.
- Bruggeman, Seth C. "Studies in American Material Culture." Temple University History 8151 Web site. Fall 2012. <http://studiesinamericanmaterialculture.blogspot.com/> (accessed 4 September 2014).
- Bumgarner, Bill. "Getting Started with a 3D Printer." *MAKE: Ultimate Guide to 3D Printing*, 12-16. Make, 2012.
- Burant, Jim. "Ephemera, Archives, and Another View of History." *Archivaria* 40 (January 1995): 189-198. <http://journals.sfu.ca/archivar/index.php/archivaria/article/view/12105/13098> (accessed 6 December 2012).
- Calvert, Karen. "Children in the House, 1890 to 1930." In *American Home Life, 1880-1930: A Social History of Spaces and Services*, edited by Jessica H. Foy and Thomas J. Schlereth, 75-93. Knoxville, Tenn.: University of Tennessee Press, 1992.
- Cecire, Natalia. Twitter. 10 January 2014, 11:17 A.M. <https://twitter.com/ncecire/status/421722404700684288> (accessed 11 January 2014).
- Cook, Terry. "The Archive(s) Is a Foreign Country: Historians, Archivists, and the Changing Archival Landscape." *The Canadian Historical Review* Vol. 90, No. 3 (September 2009): 497-534. DOI: 10.3138/chr.90.3.497 (accessed 8 November 2011).
- Cowan, Alison Leigh. "Leaving Cloister of Dusty Offices, Young Archivists Meet Like Minds." *The New York Times*. April 28, 2013. <http://www.nytimes.com/2013/04/29/nyregion/archivists-bringing-past-into-future-are-now-less-cloistered.html?pagewanted=all&r=0> (accessed 16 February 2014).
- Cowan, Ruth Schwartz. "Coal Stoves and Clean Sinks: Housework between 1890 and 1930." In *American Home Life, 1880-1930: A Social History of Spaces and Services*, edited by Jessica H. Foy and Thomas J. Schlereth, 211-224. Knoxville, Tenn.: University of Tennessee Press, 1992.
- CreateSpace. <http://www.createspacemfl.com/> (accessed 16 February 2014.)
- "Cross-shaped slots help guide screws." *Popular Science* Vol. 128, No. 1 (January 1936), 38. <http://books.google.com/books?id=eyYDAAAAMBAJ> (accessed 3 May 2014).

- “CucinaPro 265-08 Healthy Meat Grinder - #8.” Amazon.com.
http://www.amazon.com/CucinaPro-265-08-Healthy-Meat-Grinder/dp/B0000DE4LW/ref=sr_1_10?s=kitchen&ie=UTF8&qid=1367252059&sr=1-10 (accessed 29 April 2013).
- D50 archived product page. Nikon Web site. <http://www.nikonusa.com/en/Nikon-Products/Product-Archive/Digital-SLR-Cameras/D50.html> (accessed 10 July 2014).
- Deetz, James. *In Small Things Forgotten: An Archaeology of Early American Life*. New York: Anchor Books, 1996.
- Downey, Anne. Personal conversations.
- Drumm, Brook. “Printrbot: Your First 3D Printer.” Kickstarter campaign page.
<http://www.kickstarter.com/projects/printrbot/printrbot-your-first-3d-printer> (accessed 7 July 2013).
- Elliott, Devon, Robert MacDougall, and William J. Turkel. “New Old Things: Fabrication, Physical Computing, and Experiment in History Practice.” *Canadian Journal of Communication* Vol. 37 (2012): 121-128. PDF provided by the co-author 7 December 2012.
- Ewkauctions. “Vintage Miniature AC Metal Meat Grinder 5” Tall Salesman Sample or Childs Toy.” Ebay sale page. <http://www.ebay.com/itm/Vintage-Miniature-AC-Metal-Meat-Grinder-5-Tall-Salesman-Sample-or-Childs-Toy-/400305140729> (accessed 27 April 2013).
- Factor, Michael, Ealan Henis, Dalit Naor, Simona Rabinovici-Cohen, Petra Reshef, Shahr Ronen, Giovanni Michetti, and Maria Guercio. “Authenticity and Provenance in Long Term Digital Preservation: Modeling and Implementation in Preservation Aware Storage.” TaPP ’09: First Workshop on the Theory and Practice of Provenance. San Francisco, Calif., 23 February 2009.
http://www.usenix.org/event/tapp09/tech/full_papers/factor/factor.pdf (accessed 2 November 2011).
- “Fine Polyamide PA 2200 Safety data sheet.” EOS GmbH - Electro Opto Systems. 2005.
http://www.shapeways.com/rrstatic/material_docs/msds-strongflex.pdf (accessed 29 June 2014).
- Fleming, E. McClung. “Artifact Study: A Proposed Model.” *Winterthur Portfolio* Vol. 9 (1974): 153-173. <http://www.jstor.org/stable/1180572> (accessed 23 August 2012).
- Francis, Pam. "Female librarian holding finger to lips." Getty Images. Image #LA4203-002. <http://www.gettyimages.com/detail/photo/female-librarian-holding-finger-to-lips-high-res-stock-photography/LA4203-002> (accessed 16 February 2014).

From-my-attic-to-yours. "Vintage Childs Toy Cast Iron Meat Grinder AC 5"x3 1/2".
Ebay auction ending March 10, 2013. http://www.ebay.com/itm/VINTAGE-CHILDS-TOY-CAST-IRON-MEAT-GRINDER-AC-5-x3-1-2-/390554799870?ViewItem=&item=390554799870&lgeo=1&vectorid=229466&nma=true&si=4hprmZEtWJ0Js7aL%252FNwXXiFYXEI%253D&orig_cvip=true&rt=nc&_trksid=p2047675.12557 (accessed 27 April 2013).

From-my-attic-to-yours. "Vintage Childs Toy Cast Iron Meat Grinder AC 5"x3 1/2".
Ebay auction ending April 2, 2013. http://www.ebay.com/itm/VINTAGE-CHILDS-TOY-CAST-IRON-MEAT-GRINDER-AC-5-x3-1-2-/271180258069?pt=Vintage_Antique_Toys_US&hash=item3f239a5b15&nma=true&si=4hprmZEtWJ0Js7aL%252FNwXXiFYXEI%253D&orig_cvip=true&rt=nc&_trksid=p2047675.12557 (accessed 27 April 2013).

From-my-attic-to-yours. "Vintage Childs Toy Cast Iron Meat Grinder AC 5"x3 1/2".
Ebay auction ending April 11, 2013. http://www.ebay.com/itm/VINTAGE-CHILDS-TOY-CAST-IRON-MEAT-GRINDER-AC-5-x3-1-2-/390571828094?nma=true&si=4hprmZEtWJ0Js7aL%252FNwXXiFYXEI%253D&orig_cvip=true&rt=nc&_trksid=p2047675.12557 (accessed 27 April 2013).

Fuse. "Librarian Shushing." Getty Images. Image #78718683.
<http://www.gettyimages.com/detail/photo/librarian-shushing-royalty-free-image/78718683> (accessed 16 February 2014).

Gale, Porter. "6 Steps to Kickstarter Success." American Express Open Forum. May 8, 2013. <https://www.openforum.com/articles/6-steps-to-kickstarter-success/> (accessed 1 July 2013).

Ghaznavi, Mahnaz. "Standards for Digital Archives." Society of American Archivists, Continuing Education Webinar, Digital Archives Specialist Curriculum. September 29, 2011.

Gilliland-Swetland, Anne J. "Testing Our Truths: Delineating the Parameters of the Authentic Archival Electronic Record." *The American Archivist* Vol. 65, No. 2 (Fall/Winter 2002): 196-215. <http://www.jstor.org/stable/40294206> (accessed 16 October 2011).

Goldman, Rebecca. *Derangement and Description*.
<http://derangementanddescription.wordpress.com/tag/pens/> (accessed 20 January 2014).

Harness, Jill. "11 Amazing Librarian Tattoos." Mental Floss. September 10, 2012.
<http://mentalfloss.com/article/12483/11-amazing-librarian-tattoos> (accessed 16 February 2014).

Haverford College Library, Haverford, PA, Quaker Collection, Joseph H. Haines Papers, Coll. No. 950.

Haverford College Library, Haverford, PA, Quaker Collection, Margaret Mary Clark Haines Papers, Coll. No. 950.

Hegadorn, Angela. Personal conversation, 12 February 2014.

Heikenfeld, Rita Nader. "Like Max and Erma's Chocolate Chip Cookie Recipe." AboutEating.com. <http://abouteating.com/max-and-ermas-chocolate-chip-cookie-recipe/> (accessed 29 June 2014).

Herman, John. "The Amazing True Story Of The Moto X." BuzzFeed Web site. August 1, 2013. <http://www.buzzfeed.com/jwherrman/the-amazing-true-story-of-the-moto-x> (accessed 9 May 2014).

"Hershey's "Perfectly Chocolate" Chocolate Cake Recipe." Hershey's Kitchens. https://www.hersheys.com/recipes/recipe-details.aspx?utm_source=redirect&utm_medium=redirect&utm_campaign=Redirect-recipes%20%28asp%29&id=184 (accessed 29 June 2014).

Hirtle, Peter. "The Impact of Digitization on Special Collections in Libraries." *Libraries & Culture: A Journal of Library History* Vol. 37, No. 1 (Winter 2002): 42-52. <http://hdl.handle.net/1813/14206> (accessed 12 April 2013).

Jadud, Matt. "Sustainable 3D Printing for Blind Students." Kickstarter campaign page. <http://www.kickstarter.com/projects/1361811204/sustainable-3d-printing-for-blind-students> (accessed 1 July 2013).

Jimerson, Randall C. "Archives for All: Professional Responsibility and Social Justice." *The American Archivist* Vol. 70, No. 2 (Fall/Winter 2007): 252-281. <http://archivists.metapress.com/content/5n20760751v643m7/fulltext.pdf> (accessed 14 July 2014).

Joyce, Michael. "B9Creator - A High Resolution 3D Printer." Kickstarter campaign page. <http://www.kickstarter.com/projects/b9creations/b9creator-a-high-resolution-3d-printer> (accessed 7 July 2013).

Jules, Bergis. Twitter. 15 August 2014, 8:44 A.M. <https://twitter.com/BergisJules/status/500306931375161345> (accessed 5 September 2014).

"LaCuisineTM #10 Hand Operated Meat Grinder." Amazon.com. http://www.amazon.com/LaCuisineTM-Hand-Operated-Meat-Grinder/dp/B006481WHW/ref=sr_1_21?s=kitchen&ie=UTF8&qid=1367252059&sr=1-21 (accessed 29 April 2013).

- Larsen, Henrik. MScrew generator. Thingiverse. March 2, 2013.
<http://www.thingiverse.com/thing:56492> (accessed 15 February 2014).
- “Learn how to use 123d Catch.” Autodesk 123D Web Site.
<http://www.123dapp.com/howto/catch> (accessed 6 May 2014).
- Levy, David M. “Where’s Waldo? Reflections on Copies and Authenticity in a Digital Environment.” In *Authenticity in a Digital Environment*, 24-31. Washington, DC: Council on Library and Information Resources, 2000. <http://www.clir.org> (accessed 1 November 2011).
- Liu, Alan. Twitter. 10 January 2014, 12:08 P.M.
<https://twitter.com/alanyliu/status/421735440014512128> (accessed 11 January 2014).
- Lovering, Daniel. “Rhode Island librarians seek to change image with tattoo calendar.” Reuters. October 17, 2013. <http://www.reuters.com/article/2013/10/17/us-usa-librarians-tattoos-idUSBRE99G14C20131017> (accessed 16 February 2014).
- Lundwall, Michael. “RigidBot 3D Printer.” Kickstarter campaign page.
<http://www.kickstarter.com/projects/1650950769/rigidbot-3d-printer> (accessed 7 July 2013).
- McCarthy, Caroline. “Kickstarting Innovation.” Google Think Insights. September 2011.
<http://www.google.com/think/articles/kickstarting-innovation.html> (accessed 1 July 2013).
- MacNeil, Heather. “Trusting Description: Authenticity, Accountability, and Archival Description Standards.” *Journal of Archival Organization* 7, No. 3 (2009): 89-107. Accessed 19 November 2011. DOI: 10.1080/15332740903117693.
- “Meat Grinder - No Supports - Reduced Size - Ascii.” Shapeways model page.
<https://www.shapeways.com/model/upload-and-buy/2023050> (accessed 29 June 2014).
- “Meat Grinder with Table Clamp.” Amazon.com. http://www.amazon.com/Meat-Grinder-with-Table-Clamp/dp/B001TA8YWQ/ref=sr_1_14?s=kitchen&ie=UTF8&qid=1367252059&sr=1-14 (accessed 29 April 2013).
- Meringolo, Denise. “What is Public History?” In UMBC UGC New Course Request: HIST 300 Introduction to Public History. <http://www.umbc.edu/ugc/2010-2011%20Courses/HIST300.pdf> (accessed 13 December 2011).
- Meshmixer. <http://meshmixer.com/> (accessed 10 July 2014).

- Miller, Megan. "Object Analysis Method." *Owls All the Way*. September 9, 2012. <http://owlsalltheway.wordpress.com/2012/09/09/object-analysis-method/> (accessed 29 April 2013).
- Mollick, Ethan. "The Dynamics of Crowdfunding: Determinants of Success and Failure." *Journal of Business Study*, forthcoming. Preprint, http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2088298 (accessed 1 July 2013).
- Montgomery, Charles F. "The Connoisseurship of Artifacts." In *Material Culture Studies in America* edited by Thomas J. Schlereth, 143-152. London: Altamira Press, 1999.
- Moren, Dan. "Apple confirms international iPad 2 launch on March 25." *Macworld*. March 22, 2011. http://www.macworld.com/article/1158694/ipad2_international.html (accessed 10 July 2014).
- Mostern, Ruth. "Student-Authored Digital Atlases and digital Humanities Genres." Penn Digital Humanities Forum: Mapping Cultural History, Visualizing Cultural Information, Philadelphia, PA, March 29, 2013. http://humanities.sas.upenn.edu/footage/12-13/dhf_mar29.shtml.
- Mostern, Ruth. "Teaching Silk Road History with Google Earth." UC Merced Center for Research on Teaching Excellence. <http://crte.ucmerced.edu/mostern> (accessed 1 April 2013).
- Neatpieces. "Antique Miniature Meat Grinder Cast Iron Vintage Child's Toy Salesman's Sample." eBay auction ending April 17, 2013. http://www.ebay.com/itm/ANTIQUE-MINIATURE-MEAT-GRINDER-CAST-IRON-VINTAGE-CHILDS-TOY-SALESMANS-SAMPLE-/221212570274?pt=Vintage_Antique_Toys_US&hash=item33814bf2a2&nma=true&si=4hprmZEtWJ0Js7aL%252FNwXXiFYXEI%253D&orig_cvip=true&rt=nc&_trksid=p2047675.12557 (accessed 27 April 2013).
- "Nikon D50 and exclusive preview." Digital Photography Review Web site. April 20, 2005. <http://www.dpreview.com/articles/2208220954/nikond50> (accessed 10 July 2014).
- Norton, Michael I., Daniel Mochon, Dan Ariely. "The IKEA effect: When labor leads to love." *Journal of Consumer Psychology* 22 (2012): 453-460. DOI: 10.1016/j.jcps.2011.08.002 (accessed 27 February 2013).
- Oliver, Simon J. "Meshmixer 2.0: Best Newcomer in a Supporting Role?" *Extrudable.Me*. December 28, 2013.

- <http://www.extrudable.me/2013/12/28/meshmixer-2-0-best-newcomer-in-a-supporting-role/> (accessed 11 July 2014).
- “PA 2200 Material data sheet.” EOS GmbH - Electro Opto Systems. 2008.
http://www.shapeways.com/rrstatic/material_docs/mds-strongflex.pdf (accessed 29 June 2014).
- Park, Eun G. “Understanding “Authenticity” in Records and Information Management: Analyzing Practitioner Constructs.” *The American Archivist* Vol. 64, No. 2 (Fall/Winter 2001): 270-91. <http://www.jstor.org/stable/40294173> (accessed 16 October 2011).
- Pearce-Moses, Richard. *A Glossary of Archival and Records Terminology*. Chicago: Society of American Archivists, 2005. PDF Edition.
- pek4test. Screw Test Set. Thingiverse. February 21, 2013.
<http://www.thingiverse.com/thing:52656> (accessed 15 February 2014).
- Pi, Jeanne. “The Untold Story Behind Kickstarter Stats.” AppsBlogger.
<http://www.appslogger.com/behind-kickstarter-crowdfunding-stats/> (accessed 1 July 2013).
- Pirate 3D Inc. “The Buccaneer® - The 3D Printer that Everyone can use!” Kickstarter campaign page. <http://www.kickstarter.com/projects/pirate3d/the-buccaneer-the-3d-printer-that-everyone-can-use> (accessed 7 July 2013).
- Plsvab. “A Guide to Vintage Star Wars Action Figures.” Ebay Buying Guide.
<http://www.ebay.com/gds/a-guide-to-vintage-star-wars-action-figures/1000000001068796/g.html> (accessed 27 April 2013).
- Price, Kenneth M. “Edition, Project, Database, Archive, Thematic Research Collection: What’s in a Name?” *Digital Humanities Quarterly* Vol. 3, No. 3 (2009).
<http://www.digitalhumanities.org/dhq/vol/3/3/000053/000053.html> (accessed 29 March 2013).
- Prown, Jules David. “Mind in Matter: An Introduction to Material Culture Theory and Method.” *Winterthur Portfolio* Vol. 17, No. 1 (Spring 1982): 1-19.
<http://www.jstor.org/stable/1180761> (accessed 23 August 2012).
- Raiser, Marc. Fruit Screw. Thingiverse. August 8, 2013.
<http://www.thingiverse.com/thing:129874> (accessed 15 February 2014).
- Ratto, Matt. “Critical Making: Conceptual and Material Studies in Technology and Social Life.” *The Information Society* Vol. 27, No. 4 (2011): 252-260. DOI: 10.1080/01972243.2011.583819 (accessed 23 September 2012).

- Reive, Robert. "3D Printing of a Nano Vertical Axis Wind Turbine." Kickstarter campaign page. <http://www.kickstarter.com/projects/darwind5/3d-printing-of-a-nano-vertical-axis-wind-turbine> (accessed 30 June 2013).
- Roberts, B. R. Cataloging Worksheet, Accession Number 1995.15.33(.2). August 21, 1995. Germantown Historical Society Accession 1995.15.
- Rosenzweig, Roy and David Thelen. *The Presence of the Past: Popular Uses of History in American Life*. New York: Columbia University Press, 1998.
- Rothenberg, Jeff. "Preserving Authentic Digital Information." In *Authenticity in a Digital Environment*, 51-68. Washington, DC: Council on Library and Information Resources, 2000. <http://www.clir.org> (accessed 1 November 2011).
- Rubberball. "Portrait of a librarian with a finger on her lips." Getty Images. Image #56347994. <http://www.gettyimages.com/detail/photo/portrait-of-a-librarian-with-a-finger-on-her-lips-royalty-free-image/56347994> (accessed 16 February 2014).
- Rubberball/Mike Kemp. "in the library." Getty Images. Image #83605041. <http://www.gettyimages.com/detail/photo/in-the-library-royalty-free-image/83605041> (accessed 16 February 2014).
- Sak335. "Vintage Salesman Sample Childs toy Kitchen Meat Grinder Chopper Marked AC." Ebay auction ending March 24, 2013. http://www.ebay.com/itm/Vintage-Salesman-Sample-Childs-Toy-Kitchen-Meat-Grinder-Chopper-Marked-AC-/171009594085?pt=Vintage_Antique_Toys_US&hash=item27d0f752e5&nma=true&si=4hprmZEtWJ0Js7aL%252FNwXXiFYXEI%253D&orig_cvip=true&rt=nc&_trksid=p2047675.12557 (accessed 27 April 2013).
- Sarkeesian, Anita. "LEGO & Gender Part 1: Lego Friends." Feminist Frequency. 30 January 2012. <http://www.feministfrequency.com/2012/01/lego-gender-part-1-lego-friends/> (accessed 25 January 2014).
- Sarkeesian, Anita. "LEGO & Gender Part 2: The Boys Club." Feminist Frequency. 6 February 2012. <http://www.feministfrequency.com/2012/02/lego-gender-part-2-the-boys-club/> (accessed 25 January 2014).
- Scanlan, Kathryn A. "ARMA v. SAA: The History and Heart of Professional Friction." *American Archivist* Vol. 74, No. 2 (Fall/Winter 2011): 428-450. <http://archivists.metapress.com.libproxy.temple.edu/content/b52104n3n14h8654/fulltext.pdf> (accessed 23 December 2012).
- Schellenberg, T. R. *Modern Archives: Principles and Techniques*. Chicago: The Society of American Archivists, 1956. HathiTrust Edition, 25 November 2013.

- Schlereth, Thomas J. "Historic House Museums: Seven Teaching Strategies." In *Artifacts and the American Past*, 91-119. Nashville, Tenn.: American Association for State and Local History, 1980.
- Schlereth, Thomas J. "The History behind, within, and outside the History Museum." In *Cultural History and Material Culture: Everyday Life, Landscapes, Museums*, 303-329. Charlottesville, Va.: University Press of Virginia, 1992.
- "Shaping North America: Politics & Exploration." American Philosophical Society Web site. http://amphilsoc.org/library/lobbyexhibit/shaping_north_america (accessed 4 September 2014).
- ShIPLEY, Erin. "Friends of Franklin: Conflicted Transatlantic Interpretation of Benjamin Franklin in London" (Master's thesis, Temple University, 2014), draft provided by the author, 2014.
- Slosberg, Barry S. Fair Market Value Appraisal for Federal Tax Donation Purposes Only. Prepared for James D. and Rachel H. Wilson. March 22, 1995. Germantown Historical Society Accession 1995.15.
- Society of American Archivists. "Curriculum." Guidelines for a Graduate Program in Archival Studies. Society of American Archivists Web site. <http://www2.archivists.org/gpas/curriculum> (accessed 23 December 2012).
- Society of American Archivists. *Describing Archives: A Content Standard, Second Edition*. Chicago: Society of American Archivists, 2013. PDF Edition.
- "Strong & Flexible Plastic Material Information." Shapeways. <https://www.shapeways.com/materials/strong-and-flexible-plastic> (accessed 27 June 2014).
- Sweetcheeks54lr. "Vintage Toy Miniature CA Meat Grinder Cast Iron Salesman Sample." Ebay auction ending October 24, 2011. http://www.ebay.com/itm/VINTAGE-TOY-MINIATURE-CA-MEAT-GRINDER-CAST-IRON-SALESMAN-SAMPLE-/160667117688?nma=true&si=4hprmZEtWJ0Js7aL%252FNwXXiFYXEI%253D&orig_cvip=true&rt=nc&_trksid=p2047675.12557 (accessed 27 April 2013).
- Theimer, Kate. "Archives in Context and as Context." *Journal of Digital Humanities* Vol. 1, No. 2 (Spring 2012). <http://journalofdigitalhumanities.org/1-2/archives-in-context-and-as-context-by-kate-theimer/> (accessed 29 March 2013).
- Theimer, Kate. Twitter. 6 February 2014, 1:03 P.M. <https://twitter.com/archivesnext/status/431533549431189505> (accessed 6 February 2014).

- Tilden, Freeman. *Interpreting Our Heritage*. Chapel Hill, N.C.: The University of North Carolina Press, 2008.
- Timeline. Phillips Screw Company Web site. <http://www.phillips-screw.com/timeline.php> (accessed 3 May 2014).
- Turkel, William J. and Devon Elliott. "Making and Playing with Models: Using Rapid Prototyping to Explore the History and Technology of Stage Magic." 10 March 2011 draft, forthcoming in a volume edited by Kevin Kee. PDF supplied by the co-author, 7 December 2012.
- Wagstaff, Lee. "3d Tattoo Body Art Scanner." Kickstarter campaign page. <http://www.kickstarter.com/projects/404847515/3d-tattoo-body-art-scanner-archiving-the-artists-b> (accessed 1 July 2013).
- Waibel, Günter. "About Smithsonian X 3D." Smithsonian X 3D Web Site. <http://3d.si.edu/about> (accessed 14 July 2014).
- Wasserman, Todd. "Lego's 1981 Girl-Power Ad Comes With an Inspiring Backstory." Mashable. 21 January 2014. <http://mashable.com/2014/01/21/lego-girl-power-ad-1981/> (accessed 25 January 2014).
- Wenman, Cosmo. "Through a Scanner, Skulpturhalle." Kickstarter campaign page. <http://www.kickstarter.com/projects/256381543/through-a-scanner-skulpturhalle> (accessed 30 June 2013).
- "Weston Meat Grinders." Amazon.com. http://www.amazon.com/Weston-Heavy-Manual-Tinned-Grinder/dp/B000BQSW44/ref=sr_1_5?s=kitchen&ie=UTF8&qid=1367252059&sr=1-5 (accessed 29 April 2013).
- WobbleWorks LLC. "3Doodler: The World's First 3D Printing Pen." Kickstarter campaign page. <http://www.kickstarter.com/projects/1351910088/3doodler-the-worlds-first-3d-printing-pen> (accessed 7 July 2013).
- Wootton, Anne. "Pop Up Archive Breathes New (Media) Life into Dusty Archives." PBS.org. December 4, 2012. <http://www.pbs.org/idealab/2012/12/pop-up-archive-breathes-new-media-life-into-dusty-archives334/> (accessed 16 February 2014).
- Yeo, Geoffrey. "Concepts of Record (1): Evidence, Information, and Persistent Representations." *The American Archivist* Vol. 70, No. 2 (Fall/Winter 2007): 315-43. <http://www.jstor.org/stable/40294573> (accessed 16 November 2011).

APPENDIX A

KICKSTARTER

Methodology

In order to get a sense of how 3D printing is used and envisioned, I ran a search for Kickstarter projects involving “3d printing.” I did so with the intent to use Kickstarter as a tool of cultural history.

This approach has obvious limitations, beginning with the chosen keyword search. I know of at least one open 3D printing project that did not appear among the search results, and there were also a few false positives.¹ There is no public API, and rather than scraping the site in an attempt to compile a more complete data set, I opted to continue with the modest sample of a few dozen projects. Nor did I attempt to identify similar projects on other crowdfunding platforms. My data is not the basis for a rigorous statistical analysis, but instead a qualitative and somewhat speculative examination of public opinion and aspirations. Though not an exhaustive analysis, suggestive trends and outliers emerge.

Basic Campaign Data

One project (Michael Kintner’s) appeared twice in the search; I have simply treated it as a single project. I ignored five projects which were actually unrelated to 3D printing—they involved game pieces and printable rules, or 3D modeling or effects in prints of two dimensional artwork. 67 individual projects remained for analysis.

The projects' closing dates range from October 31, 2009 to August 4, 2013. 29 projects succeeded in reaching their funding goals, and 29 projects failed to meet them. 9 projects were still open, with between 11 and 34 days remaining. One project, Terence Tam's OpenBeam Kossel Pro, had three hours remaining at the time I performed the search; it had already exceeded its funding goal, so I counted it among the successful projects. One team, 3DThinkTank, ran two projects (one successful, one not) for the same product with different funding goals; I have dealt with each campaign as an independent project.

The majority of projects used U.S. dollars; six used British pounds sterling. I normalized units with Google's online currency converter, based on Citibank N.A.'s July 1, 2013 exchange rates (£1 = \$1.52), and rounded to the nearest dollar.

Most of the projects were based in the United States: Arizona (1), California (13), Colorado (6), Connecticut (1), Florida (2), Illinois (2), Massachusetts (3), Maryland (2), Michigan (2), Missouri (1), New Hampshire (1), New Jersey (2), Nevada (1), New York (4), Ohio (2), Oregon (1), Pennsylvania (2), Rhode Island (1), South Dakota (1), Texas (2), Utah (3), Virginia (1), Vermont (2), Washington (1), and the District of Columbia (1). Of the projects based in Europe, 3 were in the United Kingdom, 2 in the Netherlands, and 1 each in Germany, Norway, and Spain. One project did not list a location.

See Table 1 for data.

Table 1. Basic campaign data

Project name	Creator	Result	Closed on	State or Country
"Torc" - Celtic Boar: Sculpt, 3D(Scan & Print) Project	Paul J. Hershey	Open	11-Jul-13	CA
3D Printed windsurf, kite, surf, and paddle SmartBoards™	MADE BOARDS	Open	4-Aug-13	IL
3D-REX: A 3D-Printed Tyrannosaurus Rex Sculpture	namisu	Open	3-Aug-13	Spain
Hangar 18 Pinups: Modern Pinup Miniatures, Bawidamann Style!	Hangar 18 Miniatures	Open	16-Jul-13	CO
Inherently Useful: A 3D Printed Collection	Lance Atkins	Open	14-Jul-13	CO
Lovecrafted Games: Customizable 3D printed miniatures	Lovecrafted Games	Open	23-Jul-13	UT
ModiBot Mo: DIY action Figures with 3d Printed accessories	Go Go Dynamo	Open	12-Jul-13	RI
The Cartel Studio - Art for All!	Abbey Charles	Open	14-Jul-13	CO
The Maker Girls & the 3D Printing Revolution	Deb Chase, Principal at Moxie3D, LLC	Open	17-Jul-13	DC
3D print shops in Vermont, and soon near YOU!	Daniel Alder Riley	Success	5-Oct-12	VT
3D printed kits of the Ffestiniog Englands from laser scans	Chris Thorpe from The Flexiscale Company	Success	6-Mar-13	United Kingdom
3D Printed Robotic Hand	Christopher Chappell	Success	10-Apr-13	CO
3D Printing and Porcelain. Discovering a new process	Brock DeBoer	Success	30-May-11	MO

Table 1 (continued)

Project name	Creator	Result	Closed on	State or Country
3D Printing Electronics for Makerbot, RepRap, Cubely, Others	makerbench	Success	4-Mar-11	AZ
3D Printing for Everyone - Making the RepRap Easier to Build	RV Mendoza	Success	2-Jul-11	MI
3D Refiner by 3Dprintsexpress.com	Ross Yeager	Success	1-May-13	CA
3Doodler: The World's First 3D Printing Pen	WobbleWorks LLC	Success	25-Mar-13	MA
Artifaekt: Soul	Claire Elaine	Success	26-Apr-13	PA
B9Creator - A High Resolution 3D Printer	Michael Joyce	Success	12-Jun-12	SD
Doodle3D	Doodle3D	Success	22-May-13	Netherlands
Filabot: Plastic Filament Maker	Tyler McNaney	Success	23-Jan-12	VT
File2Part: Software that Makes 3D printing easy	File2Part	Success	19-Sep-12	MA
Gigabot 3D Printing: This is Huge!	re:3D	Success	9-May-13	TX
MakerBot - 3D Printing in a Baltimore HS Engineering Class	Weston Shreiber	Success	2-Oct-11	MD
Maxifab 3D Printing Framework	Ryan Robinson	Success	15-Apr-12	FL
MeshUp: Mashup for meshes	Uformia	Success	18-Nov-12	Norway
OpenBeam Kossel Pro	Terence Tam	Success	30-Jun-13	WA
Pebble Watch Covers	Drew Beller	Success	18-May-13	NY
Printrbot: Your First 3D Printer	Brook Drumm	Success	17-Dec-11	CA

Table 1 (continued)

Project name	Creator	Result	Closed on	State or Country
RepRap 3D printer Therminator 5 Hot End	tony may	Success	18-May-13	OH
RigidBot 3D Printer	Michael Lundwall	Success	10-May-13	UT
SIMPLY AMPLIFIED 3d Printed SYMPHONY SHELLS	3DThinkTank	Success	24-Jan-13	CA
Tapigami presents Hacker Glasses	Tapigami	Success	9-Mar-13	CA
The Buccaneer	Pirate 3D Inc.	Success	29-Jun-13	CA
The NEXT 3D Printer: A Full-Scale Exploration of Design	Eric	Success	1-May-11	MI
The Stelliform Owl	Grant Miller	Success	22-Mar-12	CA
The Vision: Not Just a 3D Printer... A DREAM	Matt Underwood	Success	28-Jun-12	IL
Zortrax M200 - professional desktop 3D printer	Zortrax	Success	21-Jun-13	NJ
360Heros: 360° Video/Photo Gear – 3D Printed for GoPro®	Michael Kintner	Unsuccessful	28-Jun-13	NY
3D Printed Bumpies...set your iPhone and iPad FREE...now!	Alexander Karp	Unsuccessful	2-Mar-13	CA
3D Printer - Bayou Mendel RepRap	The Bayou Mendel Team	Unsuccessful	14-Jun-11	TX
3D Printing of a Nano Vertical Axis Wind Turbine	Robert Reive	Unsuccessful	14-Jan-11	NJ
3d Tattoo Body Art Scanner	Lee Wagstaff	Unsuccessful	22-Apr-13	Germany
3-Dice... The first entirely 3D printed dice game!	Warren Bischoff	Unsuccessful	10-Apr-13	CT

Table 1 (continued)

Project name	Creator	Result	Closed on	State or Country
Bring your children's artwork to life as a 3D toy-heirloom	Dan Garr	Unsuccessful	7-Feb-13	CA
Cello Girl	Bob Steiner	Unsuccessful	13-Feb-12	NY
Create over 250 functional and tested 3d printable files	3Dagogo	Unsuccessful	4-May-13	CA
Custom 3D printed iPad Cases	Fresh Fiber	Unsuccessful	27-Feb-11	Netherlands
Customize & 3D Print Your Favorite Game Characters	Sandboxr	Unsuccessful	11-Apr-13	UT
Fabroot - Making 3D Fabrication Available to Everyone!	fabroot	Unsuccessful	31-Oct-09	Unknown
Full Color 3D Printer with Website for artists to Upload	FrigidFox	Unsuccessful	26-Apr-12	OH
JB Figures	Jonathan Bowen	Unsuccessful	29-Nov-11	CA
Large Stephen Colbert Head-Bre Pettis Interview-3D Printing	Alexander Dick	Unsuccessful	24-Jul-11	OR
Old Man 3D print	Matt Lambert	Unsuccessful	20-Feb-13	United Kingdom
One-to-One : Large Scale 3D Printer	Robert Cervellione	Unsuccessful	10-Mar-12	NY
Open Source Jewelry	lab760	Unsuccessful	26-Mar-13	NH
PotteryPrint: Imagine, Create, Fabricate	PotteryPrint	Unsuccessful	4-Apr-12	NV
Rapcraft: Rapid Prototyping opensource 3D Printer	Rapcraft Team	Unsuccessful	13-Jun-12	VA
RepRap: DIY Self-Replicating Rapid Prototyping 3D Printer	Caleb	Unsuccessful	18-Jul-12	CO
SAIR and DAIR Robots	Walt Perko	Unsuccessful	18-Sep-11	CA

Table 1 (continued)

Project name	Creator	Result	Closed on	State or Country
Student Built Lunar Rover Prototype for Google Lunar X PRIZE	Earthrise Space Inc.	Unsuccessful	26-Jul-12	FL
Sustainable 3D Printing for Blind Students	Matt Jadud	Unsuccessful	8-Jan-11	PA
SYMPHONY SHELLS - iPhone Amplification for Your Lifestyle	3DThinkTank	Unsuccessful	26-Aug-12	CA
The Daily Print. One 3D Print a Day	Brad Ruprecht	Unsuccessful	26-Nov-11	MD
The EZ3D Desktop Printer	Jake Wood	Unsuccessful	21-Apr-13	CO
thrint - inspiring the 3D printing home revolution	Simon Donn/Tina Brunner	Unsuccessful	24-Apr-13	United Kingdom
Unique 3D Printed jewelry	Krish Brothers	Unsuccessful	12-Nov-12	MA

Categories

The creators classified their projects using Kickstarter's taxonomy: Art (3 projects), Conceptual Art (1), Crafts (1), Design (2), Fashion (1), Graphic Design (1), Hardware (21), Open Software (1), Product Design (10), Sculpture (7), Tabletop Games (4), Technology (13), Video Games (1), and Webseries (1). I have also added a Prownian classification.² Using this scheme, the projects break down into five categories: Art (13), Diversions (9), Adornment (4), Modification of the Landscape (1), Applied Arts (8), and Devices (32).

It should be noted that some projects fit uneasily within a given category. Is a project dedicated to the artistic rendering of a tattooed human form more properly

considered Art or Adornment?³ (I have called it Art, based upon the proposed finished pieces rather than the subject matter.) How can—and should?—a project whose goal is software- and service-oriented be classified for material culture purposes?⁴ (I have simply lumped it into Devices, since the tutoring centers on using hardware and software.) In general, I have categorized projects based upon the nature of the deliverable: printed wind turbine components are a Modification of the Landscape and lighting fixtures are Applied Arts.⁵ The exercise demonstrates the flexibility of Prown's categories, and also the temptation to spend excessive time deciding which one(s) apply to a given object. I have sacrificed some nuance in favor of simplicity, and assigned only one category to each project.

See Table 2 for data.

Table 2. Prownian categories

Prownian category	Kickstarter category	Project name	Description
Adornment	Conceptual art	Artifaekt: Soul	A second try at funding! Now focussing on jewelry representing the weight of the soul (and other 3D printing adventures)
Adornment	Fashion	Open Source Jewelry	Accessories with source code! All designs to be released under a Free license for 3D printing or laser-cutting at home.
Adornment	Product design	Tapigami presents Hacker Glasses	The world's first glasses that use Tapigami lenses and 3d-printed frames to create custom, wearable art pieces!
Adornment	Product design	Unique 3D Printed jewelry	3D printing is revolutionizing the making of jewelry. We are taking one more step. Making everything unique.
Applied Arts	Product design	Custom 3D printed iPad Cases	Your chance to put your name, logo, text or icon on a 3D printed iPad case. This is the start of mass-customization in design products.
Applied Arts	Product design	Inherently Useful: A 3D Printed Collection	Mixing 3D printing, craftsmanship, & honest design. Writing, lighting, & more. Bringing useful, 3D printed goods into your home.
Applied Arts	Product design	Pebble Watch Covers	3D printed interchangeable Pebble watch covers to give it a fresh, new look.
Applied Arts	Product design	SIMPLY AMPLIFIED 3d Printed SYMPHONY SHELLS	Custom 3D printed smartphone amplifiers to be made from fully recyclable, ecofriendly material and developed with your wallet in mind.
Applied Arts	Product design	SYMPHONY SHELLS - iPhone Amplification for Your Lifestyle	3D Printed iPhone Amplifiers: NEW OPTIONS FOR iPhone 5!! Boost your phone's volume by up to 400%!

Table 2 (continued)

Prownian category	Kickstarter category	Project name	Description
Applied Arts	Technology	Create over 250 functional and tested 3d printable files	We will create, print, photograph, and catalog over 250 3D printable items and send you the files on a flashdrive.
Applied Arts	Technology	The Daily Print. One 3D Print a Day	I want to promote 3D Printing. I plan to do so by printing one thing from Thingiverse everyday then share it with the world on my blog.
Applied Arts	Technology	thrint - inspiring the 3D printing home revolution	Creating a shared collection of 1,000 3D print files, to inspire and encourage the 3D printing home revolution.
Art	Art	3d Tattoo Body Art Scanner	Using 3d technology to capture tattoos & body art to create a 360 degree digital models for 3d printing and an online archive .
Art	Art	Bring your children's artwork to life as a 3D toy-heirloom	Create a 3D toy of your children's favorite artwork. We model, 3D print, and mount in a collectible 3D frame to inspire them for years.
Art	Art	The Cartel Studio - Art for All!	The Cartel Studio is a publicly available open studio space specializing in 3D printing, screen printing, and studio photography.
Art	Sculpture	"Torc" - Celtic Boar: Sculpt, 3D(Scan & Print) Project	Goal: To finish the Sculpt, then 3D (Scan & Print) a Celtic Boar variant of a Chinese Guardian Lion (FooDog). (3D "print":1/3 master).
Art	Sculpture	3D Printing and Porcelain. Discovering a new process	I will be exploring the use of rapid prototyping to produce original forms to be reproduced in porcelain and other materials.
Art	Sculpture	3D-REX: A 3D-Printed Tyrannosaurus Rex Sculpture	3D-REX is a 3D-printed Tyrannosaurus Rex sculpture for your desk or wall.

Table 2 (continued)

Prownian category	Kickstarter category	Project name	Description
Art	Sculpture	Cello Girl	Art Sculpture project using Zbrush, 3D printing, casting and hand painting.
Art	Sculpture	Full Color 3D Printer with Website for artists to Upload	Creating a full color 3D print service that will offer post processing options for artists and a website to post and sell designs
Art	Sculpture	Old Man 3D print	Help 3D print my digital sculpture which I will then mould and cast.
Art	Sculpture	The Stelliform Owl	The Stelliform Owl is a sculpture I designed and modeled to be 3D printed and illuminated by a standard LED tea light.
Art	Technology	3D print shops in Vermont, and soon near YOU!	The first community engagement effort for the world's first 3D print shop company.
Art	Technology	Large Stephen Colbert Head-Bre Pettis Interview-3D Printing	Technology builds communities. Celebrate Bre Pettis from Makerbot's appearance on the Colbert Report. Help build a large Colbert head!
Art	Technology	PotteryPrint: Imagine, Create, Fabricate	An iPad app that enables kids to design their own unique works of pottery and export the design for 3D printing.
Devices	Crafts	SAIR and DAIR Robots	I designed the SAIR & DAIR robot parts so home hobbyists can download parts to 3D plastic print and build their own robots ... FREE!
Devices	Design	3D Printed Bumpies...set your iPhone and iPad FREE...now!	Get your own 3D printed Bumpies months before retail units are available. Enjoy your iPhone and iPad...not the case.

Table 2 (continued)

Prownian category	Kickstarter category	Project name	Description
Devices	Design	MakerBot - 3D Printing in a Baltimore HS Engineering Class	Fund a 3D printer for an urban high school engineering classroom. Inspire future engineers and get one of their creations as a reward.
Devices	Hardware	360Heros: 360° Video/Photo Gear – 3D Printed for GoPro®	Using GoPro® cameras, capture HD 360° Video & One-Click Panoramas w/ 3D Printed, Plug & Play designs covering a 360x180° Field Of View
Devices	Hardware	3D Printed Robotic Hand	By using 3D printing we can dramatically cut the cost of humanoid robotics. Make the future happen faster.
Devices	Hardware	3D Printer - Bayou Mendel RepRap	Download, design, customize and print real physical objects from the comfort of your home, office or evil lair!
Devices	Hardware	3D Printing Electronics for Makerbot, RepRap, Cubely, Others	Need the latest electronics on your 3D printer? Want to build them yourself to save some \$\$\$? We do, and it's always more fun to share.
Devices	Hardware	3D Printing for Everyone - Making the RepRap Easier to Build	The Goal: Make the process of building a RepRap less intimidating for people who are interested but don't know where to start.
Devices	Hardware	3D Refiner by 3Dprintsexpress.com	Using the 3D Refiner you'll transform any 3D Print into a high quality beautifully finished part in a fraction of the time!
Devices	Hardware	3Doodler: The World's First 3D Printing Pen	It's a pen that can draw in the air! 3Doodler is the 3D printing pen you can hold in your hand. Lift your imagination off the page!

Table 2 (continued)

Prownian category	Kickstarter category	Project name	Description
Devices	Hardware	B9Creator - A High Resolution 3D Printer	Please help us take DIY 3D Printing to the next level, support this open source photo-initiated polymer resin based 3D printing system!
Devices	Hardware	Doodle3D	With the Doodle3D sketching tool you can 3D print your own personal drawings on a 3D printer! Start 3D printing your own doodle now!
Devices	Hardware	Fabroot - Making 3D Fabrication Available to Everyone!	3D fabrication is all the rage, but costly machines and slow turn around times hinder innovation. Help us start up the first free 3D printing service
Devices	Hardware	Gigabot 3D Printing: This is Huge!	Dream big, print big! Affordable, large-format 3D printing for your home or business.
Devices	Hardware	Maxifab 3D Printing Framework	Maxifab is a project to develop a 3D printing framework. Build a 3d printer your way. No Limits.
Devices	Hardware	OpenBeam Kossel Pro	A fork of the ground breaking Kossel 3D Printer, with all 3D Printed parts injection molded for ease of assembly and cost reduction.
Devices	Hardware	Printrbot: Your First 3D Printer	A desktop 3D printer you can build in a couple hours. Print plastic parts you design or download - even parts for another printer.
Devices	Hardware	Rapcraft: Rapid Prototyping opensource 3D Printer	3D printer Rapcraft makes Thankfull 3D things and works just plug&print.
Devices	Hardware	RepRap 3D printer Terminator 5 Hot End	RepRap 3d Printing Terminator 5 Hot End

Table 2 (continued)

Prownian category	Kickstarter category	Project name	Description
Devices	Hardware	RepRap: DIY Self-Replicating Rapid Prototyping 3D Printer	I was born and raised in Colorado, am currently working towards a ME degree, and want to help the spread of Open Source 3D Printing
Devices	Hardware	RigidBot 3D Printer	A sturdy, customizable 3D printer that is easy to use and affordable for all. 3D print almost any object. There are no limits!
Devices	Hardware	The Buccaneer	To bring 3D printing technology into everyone's home by building a quality and affordable 3D printer that everyone can enjoy!
Devices	Hardware	The EZ3D Desktop Printer	The new 3D printer that embodies fun and creativity, with user friendly software and a superior printing experience.
Devices	Hardware	The Vision: Not Just a 3D Printer... A DREAM	Start 3D Printing with an Affordable, Quick Build, Optimized, Large Format 3d Printer. Available as a DIY Kit or Fully Assembled!
Devices	Open Software	Sustainable 3D Printing for Blind Students	This spring, 20 first-year students at Allegheny College will found a business offering free 3D printing support to the blind.
Devices	Product design	The NEXT 3D Printer: A Full-Scale Exploration of Design	I am building a 3D printer large enough to print functional furniture as an exploration of design through the confluence of Art & Tech
Devices	Technology	Filabot: Plastic Filament Maker	Make your own 3D printing filament from recycled bottles and other plastic products. Never run out of 3D printing filament.

Table 2 (continued)

Prownian category	Kickstarter category	Project name	Description
Devices	Technology	File2Part: Software that Makes 3D printing easy	File2Part is a powerful program that allows you to load, fix, orient, scale, and print model files on any 3D printer that uses g-codes.
Devices	Technology	MeshUp: Mashup for meshes	Super simple, always watertight, 3D modeling mashup tool for meshes, designed for painless and direct 3D printing.
Devices	Technology	One-to-One : Large Scale 3D Printer	One to One is a project focusing on 3D printing at a large scale, with speed, precision , and durable materials.
Devices	Technology	Student Built Lunar Rover Prototype for Google Lunar X PRIZE	Student built lunar rover for Google Lunar X PRIZE. Get 3D printed or CNC'd models, test-drive the rover or send your DNA to the moon!
Devices	Technology	Zortrax M200 - professional desktop 3D printer	Zortrax M200 is the professional 3D printer that will change the nature and the future of home 3D printing.
Diversions	Product design	JB Figures	Using innovations in 3D printing personal manufacturing to create completely personalized action figures.
Diversions	Product design	ModiBot Mo: DIY action Figures with 3d Printed accessories	ModiBot is a design-your-own-toy system of more than 400 different interlocking parts, personalized by 3d printing & your imagination
Diversions	Tabletop games	3D printed kits of the Ffestiniog Englands from laser scans	The Ffestiniog Englands are the world's oldest working narrow gauge engines. We're laser scanning them to make the most accurate kits.

Table 2 (continued)

Prownian category	Kickstarter category	Project name	Description
Diversions	Tabletop games	3-Dice... The first entirely 3D printed dice game!	R.P.S (Rock paper scissors) will be the first dice game in a series of entirely 3-D printed games! NEW! Get a reward without pledging!
Diversions	Tabletop games	Hangar 18 Pinups: Modern Pinup Miniatures, Bawidamann Style!	Bringing Andrew Bawidamann's pinups to life in the form of 54mm resin miniatures, using 3D sculpting and printing technologies.
Diversions	Tabletop games	Lovecrafted Games: Customizable 3D printed miniatures	Come join Lovecrafted Games! Be a part of DnD/Pathfinder history. Come 3D print your own custom tabletop experience.
Diversions	Technology	3D Printed windsurf, kite, surf, and paddle SmartBoards™	Real-time performance tracking and 3D printed manufacturing of windsurf, kite, surf and paddle boards.
Diversions	Video games	Customize & 3D Print Your Favorite Game Characters	Out of the screen and into your hands...customize and 3D print your favorite game characters with our web and mobile app!
Diversions	Webseries	The Maker Girls & the 3D Printing Revolution	Follow 5-10 young, female role models on their learning paths to becoming our next generation of #3D printing, tech savvy STEM leaders.
Modification of the landscape	Graphic design	3D Printing of a Nano Vertical Axis Wind Turbine	Fund 3D printing of a nano wind turbine for use in remote rural drinking water, irrigation, heating & lighting projects.

Funding Results

Three Art projects reached their funding goals, with two barely funded and one reaching 142.6% funding. Five of the seven unsuccessful Art projects earned under 11% of their goal, though two others made it past the 50% point. Three projects remained open at the time of analysis.

One of the Diversions projects successfully reached 159% of its funding goal. Three projects failed, with two of those remaining in the single digits and the third failing to hit the 20% point. Five projects remained open at the time of analysis.

Half of the Adornment projects (2) were successful, overshooting their goals by a small margin (107.1 and 116.9% funded). The failures were less than one quarter funded (14.3 and 20.8%).

The single project in the Modifications of the Landscape category ended at .1% funded.

Of the two successful Applied Arts projects, one barely met its funding goal whereas the other received more than double the money sought. Four projects failed; one of those succeeded in reaching nearly 40% of its goal, but the others languished between 5.7 and 26.3%. One project remained open at the time of analysis.

In the Devices category, 21 projects reached their funding goal. Squeak-through projects—100.5, 109, and 112.3% funding—were actually the outliers, with the majority of projects receiving pledges several times greater than their goals. There were 11 unsuccessful Device campaigns, with four falling between 25% and 56% funded.

See Table 3 for data.

Table 3. Funding results

Project name	Prownian category	Result	Funding %	Pledge (\$)	Goal (\$)
Open Source Jewelry	Adornment	Unsuccessful	14.3	286	2000
Unique 3D Printed jewelry	Adornment	Unsuccessful	20.8	623	3000
Tapigami presents Hacker Glasses	Adornment	Success	107.1	16058	15000
Artifaekt: Soul	Adornment	Success	116.9	1520	1300
thrint - inspiring the 3D printing home revolution	Applied Arts	Unsuccessful	5.7	1043	18268
The Daily Print. One 3D Print a Day	Applied Arts	Unsuccessful	9.4	282	3000
SYMPHONY SHELLS - iPhone Amplification for Your Lifestyle	Applied Arts	Unsuccessful	16.7	4500	27000
Custom 3D printed iPad Cases	Applied Arts	Unsuccessful	26.3	5255	20000
Create over 250 functional and tested 3d printable files	Applied Arts	Unsuccessful	39.1	1957	5000
SIMPLY AMPLIFIED 3d Printed SYMPHONY SHELLS	Applied Arts	Success	106.2	5312	5000
Pebble Watch Covers	Applied Arts	Success	222.5	10013	4500
Full Color 3D Printer with Website for artists to Upload	Art	Unsuccessful	0.1	27	45000
Old Man 3D print	Art	Unsuccessful	0.2	8	3806
Bring your children's artwork to life as a 3D toy-heirloom	Art	Unsuccessful	4.5	669	15000

Table 3 (continued)

Project name	Prownian category	Result	Funding %	Pledge (\$)	Goal (\$)
Cello Girl	Art	Unsuccessful	7.4	386	5200
Large Stephen Colbert Head-Bre Pettis Interview-3D Printing	Art	Unsuccessful	10.4	1825	17500
PotteryPrint: Imagine, Create, Fabricate	Art	Unsuccessful	50.3	6032	12000
3d Tattoo Body Art Scanner	Art	Unsuccessful	54.3	12388	22835
The Stelliform Owl	Art	Success	101.1	8091	8000
3D Printing and Porcelain. Discovering a new process	Art	Success	103.4	2585	2500
3D print shops in Vermont, and soon near YOU!	Art	Success	142.6	810	568
3D Printer - Bayou Mendel RepRap	Devices	Unsuccessful	0.4	85	20000
One-to-One : Large Scale 3D Printer	Devices	Unsuccessful	0.4	123	35000
Student Built Lunar Rover Prototype for Google Lunar X PRIZE	Devices	Unsuccessful	1.5	2949	200000
3D Printed Bumpies...set your iPhone and iPad FREE...now!	Devices	Unsuccessful	15.6	938	6000
Fabroot - Making 3D Fabrication Available to Everyone!	Devices	Unsuccessful	15.9	175	1100
360Heros: 360° Video/Photo Gear – 3D Printed for GoPro®	Devices	Unsuccessful	20.9	15703	75000

Table 3 (continued)

Project name	Prownian category	Result	Funding %	Pledge (\$)	Goal (\$)
Rapcraft: Rapid Prototyping opensource 3D Printer	Devices	Unsuccessful	26.7	13371	50000
Sustainable 3D Printing for Blind Students	Devices	Unsuccessful	38.1	692	1815
The EZ3D Desktop Printer	Devices	Unsuccessful	47	11759	25000
SAIR and DAIR Robots	Devices	Unsuccessful	50.3	2265	4500
RepRap: DIY Self-Replicating Rapid Prototyping 3D Printer	Devices	Unsuccessful	55.6	1112	2000
3D Printing for Everyone - Making the RepRap Easier to Build	Devices	Success	100.5	1055	1050
3D Printing Electronics for Makerbot, RepRap, Cubely, Others	Devices	Success	109	2724	2500
MeshUp: Mashup for meshes	Devices	Success	112.3	28082	25000
3D Printed Robotic Hand	Devices	Success	120.9	18399	15223
The NEXT 3D Printer: A Full-Scale Exploration of Design	Devices	Success	121.9	853	700
Doodle3D	Devices	Success	147.6	73777	50000
MakerBot - 3D Printing in a Baltimore HS Engineering Class	Devices	Success	157.3	3146	2000

Table 3 (continued)

Project name	Prownian category	Result	Funding %	Pledge (\$)	Goal (\$)
Zortrax M200 - professional desktop 3D printer	Devices	Success	179.5	179471	100000
OpenBeam Kossel Pro	Devices	Success	203.4	122016	60000
File2Part: Software that Makes 3D printing easy	Devices	Success	242.7	20625	8500
The Vision: Not Just a 3D Printer... A DREAM	Devices	Success	261.4	65346	25000
RepRap 3D printer Terminator 5 Hot End	Devices	Success	318.8	6376	2000
Filabot: Plastic Filament Maker	Devices	Success	323.3	32330	10000
Maxifab 3D Printing Framework	Devices	Success	487.9	24393	5000
Gigabot 3D Printing: This is Huge!	Devices	Success	626.2	250474	40000
3D Refiner by 3Dprintsexpress.com	Devices	Success	651.1	32554	5000
B9Creator - A High Resolution 3D Printer	Devices	Success	1026.8	513422	50000
The Buccaneer	Devices	Success	1438.8	1,438,765	100000
Printrbot: Your First 3D Printer	Devices	Success	3323.3	830827	25000
RigidBot 3D Printer	Devices	Success	3467	1092098	31500
3Doodler: The World's First 3D Printing Pen	Devices	Success	7813.8	2344134	30000
JB Figures	Diversions	Unsuccessful	2.3	35	1500

Table 3 (continued)

Project name	Prownian category	Result	Funding %	Pledge (\$)	Goal (\$)
3-Dice... The first entirely 3D printed dice game!	Diversions	Unsuccessful	4	79	2000
Customize & 3D Print Your Favorite Game Characters	Diversions	Unsuccessful	18.5	23082	125000
3D printed kits of the Ffestiniog Englands from laser scans	Diversions	Success	159	12105	7612
3D Printing of a Nano Vertical Axis Wind Turbine	Modification of the landscape	Unsuccessful	0.1	45	60000

Campaigns' Ambition and Success

The most successful projects, in terms of funding percentages and absolute value of pledges, were Device projects: 3Doodler (7,813.8%, \$2,344,134), RigidBot (3,467%, \$1,092,098), Printrbot (3,323.3%, \$830,827), the Buccaneer (1,438.8%, \$1,438,765), and B9Creator (1,026.8%, \$513,422). Four of those projects sought funding for 3D printers; the 3Doodler is a less conventional 3D printing pen.

The most ambitious five projects, in terms of funding goals, included 3 Devices and 2 Diversions. Only one of those projects, the Buccaneer, also ranked among the most successful; one Diversion and one Device project failed; the most ambitious project (\$450,000) was still open.

Seven projects had modest goals ranging from \$500-1,000. Of those, one was open. Two projects (1 Diversion and 1 Device) failed. The other four (1 Art, 1 Adornment, 2 Devices) succeeded.

See Table 3 above for data.

Backers

Kickstarter projects offer backers rewards at different pledge levels. Small pledges—set as low as \$1 for some campaigns—entitle backers to gratitude and tchotchkes (updates, public acknowledgment of support, keychains, bumper stickers, T-shirts, etc.) An individual merely interested in owning the product of one of these pieces of hardware could back a project at a lower level. At the \$25 level, the 3Doodler project offered wire art created by Etsy artists. Higher pledges entitled backers to rewards which included the hardware (printer or pen), with varying degrees of assembly required. Over 90% of the supporters of the RigidBot, 3Doodler, and Buccaneer project elected for the higher pledge levels (98, 96, and 93%). 81% and 63% of Printrbot and B9Creator supporters, respectively, did likewise.⁶

Low pledge levels allow backers to support interesting projects inexpensively, so backing can be a form of philosophical or moral support. But especially in the Hardware category, Kickstarter can be viewed as a marketplace, and project supporters as consumers who have paid for something tangible. The backers of 3D printing projects had less interest in the objects pertaining to printers, or the objects created by others, than they did in the devices themselves.

See Table 4 for data.

Table 4. Backers of 3D printer projects

Project	Total backers	Minimum pledge level for device (\$)	Backers at low levels (#)	Backers at high levels (#)	Backers receiving device (%)
B9Creator	388	2375	143	245	63
Printbot	1808	75	345	1463	81
The Buccaneer	3520	297	262	3258	93
3Doodler	26457	50	1068	25389	96
RigidBot	1952	299	31	1921	98

¹ I stripped the false positives from my Kickstarter data tables. For a project that did not appear with the keyword search see Cosmo Wenman, “Through a Scanner, Skulpturhalle,” Kickstarter campaign page, <http://www.kickstarter.com/projects/256381543/through-a-scanner-skulpturhalle> (accessed 30 June 2013).

² Jules David Prown, “Mind in Matter: An Introduction to Material Culture Theory and Method,” *Winterthur Portfolio* Vol. 17, No. 1 (Spring 1982), 3, <http://www.jstor.org/stable/1180761> (accessed 23 August 2012).

³ Lee Wagstaff, “3d Tattoo Body Art Scanner,” Kickstarter campaign page, <http://www.kickstarter.com/projects/404847515/3d-tattoo-body-art-scanner-archiving-the-artists-b> (accessed 1 July 2013).

⁴ Matt Jadud, “Sustainable 3D Printing for Blind Students,” Kickstarter campaign page, <http://www.kickstarter.com/projects/1361811204/sustainable-3d-printing-for-blind-students> (accessed 1 July 2013).

⁵ Lance Atkins, “Inherently Useful: A 3D Printed Collection,” Kickstarter campaign page, <http://www.kickstarter.com/projects/lanceiscool/inherently-useful-a-3d-printed-collection> (accessed 1 July 2013); Robert Reive, “3D Printing of a Nano Vertical Axis Wind Turbine,” Kickstarter campaign page, <http://www.kickstarter.com/projects/darwind5/3d-printing-of-a-nano-vertical-axis-wind-turbine> (accessed 30 June 2013).

⁶ Brook Drumm, “Printbot: Your First 3D Printer,” Kickstarter campaign page, <http://www.kickstarter.com/projects/printbot/printbot-your-first-3d-printer> (accessed 7 July 2013); Michael Joyce, “B9Creator - A High Resolution 3D Printer,” Kickstarter campaign page, <http://www.kickstarter.com/projects/b9creations/b9creator-a-high-resolution-3d-printer> (accessed 7 July 2013); Michael Lundwall, “RigidBot 3D Printer,” Kickstarter campaign page, <http://www.kickstarter.com/projects/1650950769/rigidbot-3d-printer> (accessed 7 July 2013); Pirate 3D Inc., “The Buccaneer® - The 3D Printer that Everyone can use!,” Kickstarter campaign page,

<http://www.kickstarter.com/projects/pirate3d/the-buccaneer-the-3d-printer-that-everyone-can-use> (accessed 7 July 2013); WobbleWorks LLC, “3Doodler: The World’s First 3D Printing Pen,” Kickstarter campaign page, <http://www.kickstarter.com/projects/1351910088/3doodler-the-worlds-first-3d-printing-pen> (accessed 7 July 2013). The Printrbot data is not completely analogous to the other projects, as there were a number of different levels of “complete” printers. I opted to use the lowest level, which offered the printed parts needed to assemble the Printrbot but excluded hardware. Because of the DIY nature of the rewards the level offering project-specific components seems most appropriate for the comparison and most useful for answering the question of whether backers want satisfaction, tchotchkes, or the ability to create.

APPENDIX B

TECHNOLOGY CHOICES

The photographs I used to build my model were taken using an LG Optimus G. Released in 2012, the Optimus G is a midrange smartphone running Android 4.0.4. The camera is 13 megapixels, with a resolution of 4208 x 3120 pixels. Though I have added applications available through Google's Marketplace—Aldiko, Angry Birds, Facebook, Fruit Ninja, NPR, Wonder Weeks, and the like—the phone substantially conforms to factory specifications.

I also took photographs using a Nikon and an iPad. The Nikon D50, a 6.1 megapixel DSLR, is nearly a decade old. It was announced as retailing for \$899 (though I cannot remember what we actually paid for it).¹ The iPad 2, model MC770LL/A, retailed for \$599 when it was released in 2011 (though ours was free: my husband won it in a contest at work).² In short, they are generally well-reviewed consumer devices. They are relatively old (in terms of product life cycle and, in the case of the Nikon, chronologically), not cheap at the time of manufacture but also not highly specialized equipment.

Though the Nikon and iPad photographs were not ultimately the ones I used to build a model, these devices were still part of my process. They provided the opportunity to experiment and compare the results of different devices (in a more humanistic, less technical specifications-based manner) and, in fact, it essentially came down to a coin flip as to whether I would build my model using an LG or Nikon photo set. Photographs taken with the Nikon and iPad are among the images included in this paper.

My laptop is an Acer Aspire 5755-6699 with an Intel Core i3-2330M and Intel graphics card. While I have installed programs—Microsoft Office 2010, Scrivener, Skype—I have not done anything particularly adventurous. The laptop runs a factory-installed Windows operating system. In 2010, the Acer was a \$400-price point machine. All modeling for this project was done on this machine. So, for that matter, was the vast majority of the research and writing, which involved Firefox, Scrivener, and Microsoft Word.

Autodesk's 123D Catch is available as a free download, an Apple application, and a web-based application. (Premium options exist, with added benefits including licenses to use models for commercial purposes, discounts on MakerBot purchases, and the option to create 2D .dwg files. None were relevant to my project.) The system requirements for the desktop version are modest: Windows 7 or higher, XP Service Pack 3 or higher, an Intel Core 2Duo, 1 GB RAM, 1 GB disk space, an OpenGL compatible video card with 256 MB memory, and Microsoft run-time libraries.³ I did not experiment with the iPad or iPhone versions: I have an Android phone, and the household iPad is largely dedicated to streaming media and an exhaustive collection of horse-themed games. Ultimately I used the web-based application.

Meshmixer, another Autodesk application, bills itself as a tool for “making crazy-ass 3D stuff without too much hassle.” It is available as a free download for Windows and Mac. Though the software is being actively developed (the most recent version as of this writing, 2.4, was released in May 2014), the official documentation is nearly two years out of date and rather light on technical specifications.⁴

I selected hardware and software based on availability and minimal expenditure. My motivation was, in part, selfish: I did not want to spend a great deal of money on this project, so I used tools at hand. However, price-consciousness is also part of my argument. I wish to demonstrate that repositories can undertake a project like this without the investment of significant resources. It is reasonable to expect that someone on staff will own a device capable of taking digital pictures. (Autodesk recommends 3 megapixels or above, a requirement met by many older devices.) Internet connectivity is ubiquitous, as is the Windows operating system. Any reasonably current machine is likely suitable for the desktop version of 123D Catch without any special modifications. Repositories with older machines can take advantage of online applications, or use the personal devices of Apple fans on staff. In short, the technological barriers to entry are low, and the necessary equipment probably already sits on desks—or in pockets—at a repository.

¹ D50 archived product page, Nikon Web site, <http://www.nikonusa.com/en/Nikon-Products/Product-Archive/Digital-SLR-Cameras/D50.html> (accessed 10 July 2014); “Nikon D50 and exclusive preview” Digital Photography Review Web site, April 20, 2005, <http://www.dpreview.com/articles/2208220954/nikond50> (accessed 10 July 2014). I feel compelled to protest the use of the term “archived product” used by Nikon. I echo Theimer’s objections to the manner in which the term “archives” has been applied within the digital humanities, albeit within the context of consumer electronics rather than academic disciplines. (Kate Theimer, “Archives in Context and as Context,” *Journal of Digital Humanities* Vol. 1, No. 2 (Spring 2012), <http://journalofdigitalhumanities.org/1-2/archives-in-context-and-as-context-by-kate-theimer/> (accessed 29 March 2013).) The D50 has been discontinued: it is no longer manufactured. Nikon may for all I know maintain some number of units in a corporate archive or museum, and it’s fair to say that those particular units have been archived. But that does not apply to the broader class of all D50s.

² Moren, Dan. “Apple confirms international iPad 2 launch on March 25.” Macworld. March 22, 2011. http://www.macworld.com/article/1158694/ipad2_international.html (accessed 10 July 2014).

³ For specifications, see Autodesk 123D, <http://www.123dapp.com/catch> (accessed 10 July 2014).

⁴ See Meshmixer, <http://meshmixer.com/> (accessed 10 July 2014).