

ABSTRACT

Title of Thesis: A BAROMETER OF SCIENTIFIC CULTURE:
THE DEBATED ROLE OF AMERICAN
SCIENCE AT THE 1850'S SMITHSONIAN
INSTITUTION

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During the initial decade of the Smithsonian Institution's existence, its first secretary, Joseph Henry, sought to establish an institution for the advancement of science that defied popular understandings of scientific work in the United States. From the end of the eighteenth century and into the nineteenth century, American science was infused with republican ideology and was widely expected to prioritize practical results that would directly benefit society at large. At the Smithsonian, Henry sought to establish a boundary between professional, theoretical science, conducted and distributed more selectively among experts, and wider public influence and demand for utilitarian scientific work. Examination of discourse in popular publications reveals that Henry's plan created an ongoing public debate in the 1850s regarding the Smithsonian's legitimate scientific mission. This included criticism of the Smithsonian publications program's inaccessibility and lack of utility to the public as well as many alternative proposals for how the institution might be of better scientific use to Americans. Such expectations that Smithsonian research and resources would serve the general American population were also expressed throughout the correspondence of the Smithsonian Meteorology Project—the Institution's first major scientific research initiative. Although Henry sought to create a boundary between the

Institution's work and the public, the utilitarian demands of many of the project's volunteer observers ensured that the practical goals of the public remained intertwined with Henry's own goals to promote theoretical science in the development of the Smithsonian. The influential work of this extended scientific community was often made possible through the contributions of additional members of households. Close reading of the meteorological project correspondence reveals an extensive, although often officially unacknowledged, contribution from women and other individuals whose labor was often more fixed to the household. While the public volunteers of the project shaped the trajectory of the Smithsonian, the devalued labor of peripheral contributors to the Institution's large-scale data work set important precedent for professional scientific frameworks at the end of the century. Overall, the relationship between the early Smithsonian and the public in the 1850s demonstrates that the process of establishing borders defining a professional/amateur dichotomy in American science was uneven. The Institution contended with republican expectations of the scientific public and its projects continued to rely upon contributors without formal or elite credentials who in turn demanded accessible and practical research and shaped scientific institutions. Despite Joseph Henry's contribution to the professionalization and specialization of science, the boundaries of science and who could participate in scientific research remained fluid through the mid-nineteenth century.

A BAROMETER OF SCIENTIFIC CULTURE: THE DEBATED ROLE OF AMERICAN
SCIENCE AT THE 1850'S SMITHSONIAN INSTITUTION

by

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Dedication

To my parents, Patricia and James Buser, for their continuous support and encouragement
throughout my studies.

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Introduction

Summarizing the Smithsonian Institution's operations in 1850, Joseph Henry, the Secretary of the Smithsonian Institution since its founding in 1846, began his annual report to Congress with a statement of frustration: "Though the programme of organization has been given in two of the annual reports and extensively published in the newspapers, its character does not appear to be as widely known and as properly appreciated as would be desired."¹ Serving in his fifth year as the Smithsonian's first appointed secretary, Henry was prepared to articulate his vision of how to carry out James Smithson's notably brief and ambiguous bequest for an institution "to [be] found at Washington, under the name of the Smithsonian Institution, an Establishment for the increase & diffusion of knowledge among men."² Henry's plan of organization demonstrated less concern with the Institution's direct service to an intellectually minded public or "mankind's" general education, but rather supported more specialized research and prioritized the direct distribution of that work to comparable research institutions in the United States and abroad. Through these methods, he imagined that the formal research generated by the Smithsonian would eventually trickle-down and benefit the rest of the world through a more indirect diffusion of knowledge, thus fulfilling its mission.

To remind Congress and the report's readers of the Smithsonian's purpose, Henry dedicated his *Fifth Annual Report's* first section to outlining the Institution's establishment and guiding principles. He criticized "the great majority" of Americans who focused primarily on the second aspect of the Smithson bequest, concerned with "merely the diffusion of popular

¹ Smithsonian Institution, *Fifth Annual Report of the Board of Regents of the Smithsonian Institution, to the Senate and House Representatives showing the Operations, Expenditures, and Condition of the Institution During the Year 1850* (1851), 5 (hereafter cited as SI, *Fifth Annual Report*).

² These words are the only guidance given in Smithson's will for the institution's scope and purpose, see *An Act to Establish the "Smithsonian Institution," for the Increase and Diffusion of Knowledge Among Men*, Public Law 102. *U.S. Statutes at Large* 9 (1846): 104.

information.” Instead, he designated the “increase of knowledge” as the Smithsonian Institution’s primary intended function, arguing that the only plan offering true conformance with the bequest was “instituting original researches, under the direction of suitable persons. ...”³

Henry frequently expressed regret that the 1845 act passed by Congress establishing the Smithsonian dictated a requirement for the construction of a large and expensive building to house a library, museum, lecture hall, and art gallery. These efforts only diverted funds and attention from what he thought was the “most important object” – publications. He viewed museum displays, lectures, and establishing a national library only as passive tasks in the effort to create and spread new knowledge. To him, these elements were not the most effective means to increase knowledge through specialized research, and he sought to stymie the inevitable growth of national collections with housing and maintenance costs which likely would exceed the resources of the Institution in time. Rather, Henry believed, “It is chiefly by the publications of the Institution that its fame is to be spread through the world, and the monument most befitting the name of Smithson, erected to his memory.”⁴ He argued that supporting original, professional research, publishing such work, and distributing those publications among commensurate scholarly institutions would best promote science and actively fulfill the Smithsonian’s mission.

Henry emphasized that, according to his plan, the research reports produced by the Smithsonian were not written for a wider public audience. Rather, the benefit of the Institution’s work would be felt eventually by the general population as new ideas trickled down through scholars and teachers better equipped to understand and interpret their value. Therefore, Henry

³ SI, *Fifth Annual Report*, 6.

⁴ SI, *Fifth Annual Report*, 10.

stated, distribution of the Smithsonian's publications required prioritizing a select intellectual audience "who will make the best use of them in diffusing a knowledge of their contents."⁵

While Henry reiterated his vision and goals for the Smithsonian Institution, his testimony before the United States Congress revealed wider contradiction to aspects of his plan— further action would be required to convince the public of the first Secretary's path for the Institution.

Since the 1970s, historians have reconsidered the boundaries of science and society in the nineteenth-century United States. Rather than finding a solidly defined field of trained professional scientists, scholars describe the borders of scientific involvement and practice as porous and not necessarily dependent on factors of education level, gender, location, or occupation. This wider culture of science was notably shaped by the utilitarian values and republican ideology of the early American republic. Historians of science trace the beginning of movement toward professionalizing science from the mid-nineteenth century, identifying the Smithsonian as an early institution working to establish science as a theoretical field apart from practical and utilitarian frameworks of fields such as engineering or agricultural science. From his authority at the Smithsonian, Joseph Henry would play a key role in restricting the boundaries of legitimate science to formal and elite practitioners.⁶ Where several scholars

⁵ SI, *Fifth Annual Report*, 14.

⁶ Arthur P. Molella does center on the discord between Henry and those Henry viewed as outside of formal science, but it is largely from Henry's perspective and limited to correspondence with persons purporting "fringe" ideas rather than the larger scientific culture, Arthur P. Molella, "At the Edge of Science: Joseph Henry, 'Visionary Theorizers', and the Smithsonian Institution," *Annals of Science* 41, no. 5 (1984): pp. 445-461; Where Daniel Goldstein centralizes expanded scientific networks in his examination of the Smithsonian's meteorological observers, he does not identify where those belonging to wider networks may have had opposing interests to trends of professionalization occurring at the Smithsonian, "'Yours for Science': The Smithsonian Institution's Correspondents and the Shape of Scientific Community in Nineteenth-Century America," *Isis* 85, no. 4 (December 1994): pp. 573-599. While Michael Francis Conlin incorporates public opinion and acknowledges broader contributions to the institution's early scientific activities in his study, he does not focus on this relationship and largely centers his analysis of the early Smithsonian on the political actions of its leaders and involved members of Congress, Michael Francis Conlin, "Science under Siege: Joseph Henry's Smithsonian, 1846-1865" (PhD thesis, University of Illinois at Urbana-Champaign, 1999); Iwan Rhys Morus acknowledges Henry's role in early efforts at professionalizing Smithsonian activities and their misalignment with existing American science in his review of Henry's publish papers, however his review does not explore the wider public discourse of these actions, Iwan Rhys

studying the formative years of the Smithsonian have analyzed extended networks of science, there has been less examination of the broader public's relationship with and popular discourse surrounding the Smithsonian and its mid-century efforts to establish professional boundaries of science.

Public discourse and interaction surrounding the Smithsonian Institution in the first decade following its establishment provides an opportunity to examine how popular expectations of science clashed with early efforts to professionalize science. Many Americans were highly familiar with the Smithsonian from publications describing the life of James Smithson and his bequest as Congressional debates over the vague terms of that bequest were reported on in newspapers. Furthermore, the Institution's first Secretary, acclaimed scientist Joseph Henry, led early work to impose restrictions on the professionalization of science and shift conceptions and practices of American science from a democratic and practical model, which incorporated a scientific-minded public, toward one of formal inquiry regulated by professional specialists, as was visible in his plan of organization for the Smithsonian after its establishment. Reflecting on the first fifty years of the Institution, assistant Smithsonian Secretary George Brown Goode's 1896 history of the Smithsonian Institution highlights Henry's role in organizing science into a professional discipline of standardized practice. In his profile of Henry, Goode wrote that "the early history of American science is very closely connected with the life of Professor Henry. ... He participated in the early movements for the national organization of science. In his later years

Morus, "Henry's House: The Smithsonian Institution and The Making of American Public Science," *Annals of Science* 58, no. 4 (2001): pp. 409-416; Marlana Portolano's dichotomy of "scientific inquiry" vs. "common inquiry" emulates professional vs. amateur framework of contemporary scientific hierarchies, Marlana Portolano, "Increase and Diffusion of Knowledge: Ethos of Science and Education in the Smithsonian's Inception," *Rhetoric Review* 18, no. 1 (1999): pp. 65-81.

he was an acknowledged leader in the work of maintaining and extending these, in accordance with the tendencies of modern thought.”⁷

Defending his program of organization remained a necessary part of Henry’s efforts to define the Smithsonian as an institution of meticulous scientific research and publishing and, in doing so, he contributed to efforts to specialize and organize American science. In his previous position as a professor of Natural Philosophy at Princeton from 1832 to 1846, Henry had conducted notable work on electromagnetic induction. In 1837, his position took him to England, France, and Scotland where he observed European scientific institutions.⁸ Such institutions were typically more hierarchical, specialized, and theoretically oriented than republican American scientific practice.⁹ Historian of nineteenth-century science Sally Gregory Kohlstedt points to Alexis de Tocqueville’s perception in the 1830’s that although Americans worked diligently to apply science to practical technological advancement, Americans had less interest in theoretical physical science.¹⁰ Historian of Victorian science Iwan Rhys Morus finds Henry’s 1837 observations of European scientific intuitions highly influential in shaping his later efforts toward organizing a more elite framework of science. “His experiences at meetings of the British Association of the Advancement of Science and his mixed reception there gave him a powerful sense of how American organizations might best proceed and equally of the condescension which many European felt towards American culture in general and their science in particular.”¹¹ Rather than prioritizing goals of utilitarian application and meeting popular demands, Henry

⁷ George Brown Goode, *The Smithsonian Institution, 1846-1896 the History of Its First Half Century* (Washington D.C.: Smithsonian Institution, 1897), 115.

⁸ Albert E. Moyer, *Joseph Henry: The Rise of an American Scientist* (Washington, D.C.: Smithsonian Institution Press, 1997), 205.

⁹ Bolton Conevery Valencius et al., “Science in Early America: Print Culture and the Sciences of Territoriality,” *Journal of the Early Republic* 36, no. 1 (2016): pp. 73-123, 73-74.

¹⁰ Sally Gregory Kohlstedt, *The Formation of the American Scientific Community: The American Association for the Advancement of Science, 1848-60* (Urbana-Champaign, IL: University of Illinois Press, 1976), 4-5.

¹¹ Morus, “Henry’s House,” 411.

sought to reorganize American science as a professionally regulated field pursuing more theoretical inquiries with less or no intervention by the public. However, his attempt to institute this hierarchical vision at the Smithsonian forced him to contend with existing, influential republican expectations of the scientific public.

From the time Congress accepted the Smithson bequest in the late 1830s to its establishment of the Smithsonian Institution in 1846, American understandings of science were deeply interwoven with republican ideology. As discussed by historian Hyman Kuritz, this conceptualization of science in the late eighteenth and early nineteenth-century United States was linked with a utilitarian notion that its practice and product would “satisfy the everyday needs of ordinary people in contrast to later and more narrow definitions that linked ‘useful’ knowledge to particular vocational goals or to the specific interests of industry.”¹² Such republican scientific efforts were both a path for self-improvement as well as a source of knowledge discovery and diffusion that would strengthen the citizenry. Through advancing and promoting practical scientific work to the public beyond class restrictions or social status, men of science would idealistically help cultivate the educated and informed voting populace necessary for a democratic society.

Historians of modern science Roger Cooter and Stephen Pumfrey align this wider public interest in sciences with late eighteenth and early nineteenth-century shifts in society posited in Jürgen Habermas’ *Structural Transformation of the Public Sphere*. As markets expanded and required wider public regulation of economic activities, the internal authority and social ties of the traditional household-based economy broke down and were replaced by external public

¹² Hyman Kuritz, “The Popularization of Science in Nineteenth-Century America,” *History of Education Quarterly* 21, no. 3 (1981): pp. 259-274, 260.

authority.¹³ While Habermas does not discuss the role of science, his theory of the formation of a civil public sphere that arose to regulate the rising state public sphere describes the conditions under which the scientific field developed in the late eighteenth and early nineteenth centuries, in that the development of scientific careers relied on public forums for legitimization. Cooter and Pumfrey find that “indeed, many now-familiar aspects of scientificity, which were lacking in pre-modern periods, can be seen to be a part of Habermas's structural transformation - for example, public dissemination for the purposes of persuasion and assent; the experiment as the suitable vehicle for this persuasion; and the growth of societies, journals and popular literature.”¹⁴

Thus, establishing one's credibility as a scientist was not necessarily reliant on attaining documentation from a private university, but rather required publically demonstrating scientific ideas and providing useful knowledge for the endorsement of civil authorities.¹⁵ As historian of nineteenth-century American culture, Donald M. Scott observes, wider American public involvement in intellectual spaces and processes was part of the rise in popularity of the public lecture system by the 1830s. “Lecture-going Americans not only wanted knowledge, they also insisted that it be accessible to them. Knowledge was considered a public commodity... any attempt to cut off access to knowledge was considered not only a violation of democratic theory, but also a kind of personal injury, an obstacle blocking one's freedom to develop as she or he saw

¹³ Jürgen Habermas, *The Structural Transformation of the Public Sphere: An Inquiry into a Category of Bourgeois Society* (Cambridge, MA: MIT Press, 1989), 154-159; Kuritz, “The Popularization of Science,” 261-262; For transformation from household to market economy and changing social and class ties, see Mary P. Ryan, *Cradle of the Middle Class: The Family in Oneida County, New York, 1790-1865* (Cambridge University Press, 2004) and Sean Wilentz, *Chants Democratic: New York City and the Rise of the American Working Class, 1788 - 1850* (Oxford University Press, 1984).

¹⁴ Roger Cooter and Stephen Pumfrey, “Separate Spheres and Public Places: Reflections on the History of Science Popularization and Science in Popular Culture,” *History of Science* 32, no. 3 (September 1, 1994): pp. 237-267, 244.

¹⁵ “For science to grow and for the scientist to find a legitimate and respected place for himself in society, a first requirement was the creation of a public that perceived science as important to itself and society.” Kuritz, “The Popularization of Science,” 261.

fit.”¹⁶ While lecture attendance was more restricted to urban areas than print culture and attracted a more middle-class audience, these attendees were still diverse in age, gender, and profession.

Audiences played a vital role in establishing the professions of the lecturers themselves. Changes to economies and trade structures brought by the market revolution and the rise of urban anonymity, Scott argues, disintegrated eighteenth century occupational markers and methods of instituting one’s trade. In short, establishing an intellectual profession was a decentralized process that could not rely on any singular form of credential. The legitimization of one’s status as an intellectual by a public lecture audience became one method of effectively demonstrating recognition of a career.¹⁷ In this intellectual economy, audiences exchanged their endorsement of a lecturer’s reputation and career for the knowledge diffused in lectures that might help them organize and comprehend their own place in the rapidly changing nineteenth-century world as well as a sense of belonging to a larger intellectual community.¹⁸

By understanding this wider public involvement, historians of science of the early American republic have demonstrated that older historical analyses preceding the 1970’s incorrectly applied more modern hierarchies of knowledge production. Rather than relegating the scientific community to a few formally trained elite men conducting specialized professional work, more recent historians instead adopt an expansive lens which reveals a wider landscape of participants and a more permeable understanding of scientific activity.¹⁹ Both Kuritz and other

¹⁶ Donald M. Scott, “The Popular Lecture and the Creation of a Public in Mid-Nineteenth-Century America,” *The Journal of American History* 66, no. 4 (March 1980): pp. 791-809, 801-802.

¹⁷ Scott, “The Popular Lecture and the Creation of a Public in Mid-Nineteenth-Century America,” 807.

¹⁸ Scott, “The Popular Lecture and the Creation of a Public in Mid-Nineteenth-Century America,” 806-808.

¹⁹ See Valencius et al., “Science in Early America”; Goldstein, “‘Yours for Science’”; Kohlstedt, *The Formation of the American Scientific Community*; Kuritz, “The Popularization of Science”; Cooter and Pumfrey concur that “the shape and success of the sciences depended upon a complete set of social relations linking different scientific

historians of American science acknowledge the broader audiences and participation in science cultivated by the first scientific journals. Valencius et al. emphasize how the role played by increased literacy and improved printing technology in the nineteenth century facilitated more diverse networks of American scientific involvement. Inexpensive postal systems, decentralized print markets, and a conception of shared democratic values all “contributed essentially to the diversity of ways in which people who could write and read were well-equipped to express their thoughts about contemporary science in early America.”²⁰

Unlike European institutions of science, American republican conceptions of scientific work considered practical observation and experiment to be just as (if not more) scientifically valuable than formal theoretical work. Inquiries and observations printed in a variety of accessible media, particularly journals and newspapers, created a culture of overlapping professional and experiential practice, allowing a broad range of people to become “active shapers of scientific information.”²³ Valencius et al. point to the new genre of commercial scientific consulting reports which increased the diffusion of scientific ideas to the general public. Private businesses would hire men of science to solve commercial problems or provide scientific endorsement of their enterprises. These researchers summarized their findings in reports written for wider audiences of clients and potential investors, which were frequently circulated by businesses in cheaply produced pamphlets. Such reports circulated beyond their intended commercial purposes as they were often cited in government reports, books, and articles. “Through the publication of consulting reports as pamphlets, in business prospectuses, as revised scientific articles, and in newspaper excerpts, American businesses and the general

communities with various allies, audiences, publics, consumers and reproducers. ...” Cooter and Pumfrey,” *Separate Spheres and Public Places*,” 240.

²⁰ Valencius et al., “Science in Early America, 78.

public became familiar with the methods and findings of men of science. Science and scientific discussion thus became readily accessible to a large population of literate Americans...”²¹

Daniel Goldstein identifies such extended networks and communities of scientific activity within the early operations of the Smithsonian. To enable scientific research into questions of storm formation and other weather-related phenomena, an early project undertaken by Henry as Secretary included establishing a robust volunteer correspondents’ network of men and some women across the United States. These correspondents operated equipment and conducted calculations to provide the Smithsonian with nation-wide evidence and data, an association which in turn benefited their own scientific pursuits. Goldstein finds this extensive network an effective demonstration of the nineteenth century’s decentralized community of scientific-minded Americans whose membership comprised of both men and women of varying levels of education and a range of occupations.²² Such interest was generated across this wider group for a multitude of reasons, including feelings of nationalism, business or intellectual ambition, or religious understandings of the natural world. These interests overlapped with and diverged from Henry’s own vision of American science, complicating the boundaries of scientific work at the early Smithsonian. Though Henry contributed to the professionalization and specialization of science, public discussion regarding the purpose of the Smithsonian Institution and public involvement in Smithsonian research efforts such as the meteorological project demonstrate that boundaries of science and who could participate in scientific research remained fluid in the mid-nineteenth-century United States.

This study’s first chapter, “Professional Publications and Penny Magazines: Popular Press Discourse Regarding Access to Early Smithsonian Research”, examines the public

²¹ Goldstein, “‘Yours for Science’,” 103.

²² Goldstein, “‘Yours for Science’,” 577.

discussions and debates surrounding Joseph Henry's plan of active operations in the Smithsonian Institution's first decade. High demand for the Smithsonian's publications prompted a national discourse regarding who should have access to Smithsonian research and who that knowledge should directly benefit. Contributors to newspapers, journals, and magazines frequently expressed a republican understanding of the Institution's mission which, as indicated in his annual reports, contradicted Henry's efforts to curb expectation that the Smithsonian Fund would directly serve the American public.

Chapter two, "The Smithsonian Meteorological Project: Demands and Expectations of the 1850's Extended Scientific Community" analyzes the second most important piece of Henry's plan of operations, the Smithsonian Meteorological Project. To achieve his own goals for the Institution to advance abstract meteorological research, Henry relied on an extended network of the scientific public outside of elite circles to conduct essential, large-scale data collection. Through examining the correspondence of the meteorological observers, this chapter demonstrates how public volunteers leveraged their relationship with the Smithsonian to obtain resources for their own, often practical scientific needs and the project's influential role in shaping the early Smithsonian.

Through close reading of the meteorological project correspondence, chapter three, "Data Collection from the Periphery: Women and the Obscured Role of the Scientific Household in the Antebellum Smithsonian Meteorological Project," seeks to expand understanding of who contributed to the scientific work of the early Smithsonian by investigating the roles of individuals who were relegated to the periphery of the extended scientific community. Though these individuals played an essential role in data collection and their work enabled white male volunteers to form relationships with the Institution, many were only ever briefly mentioned and

often went officially unacknowledged in published lists of meteorological observers. Such frameworks that devalued their scientific labor and relegated them to designated secondary roles set important precedent for labor hierarchies in professional scientific fields at the end of the century.

The perspectives within this work's sources are largely limited to middle or upper class, white, and male demographics. However, as other historians of science in this period have pointed out, the silencing of voices in written and published source formats does not disqualify the scientific knowledge and contributions of those outside of dominant society, including indigenous and enslaved people, as well as the full extent of women and free black people in scientific networks.²³ This work also does not provide a comprehensive examination of the Smithsonian's early activities or its internal politics and relationship with Congress.²⁴ Rather, it identifies elements of the Institution that were made prominent in the press and among institutional correspondents and analyzes activities frequently referenced in such portrayals of the Smithsonian by the wider public.

Despite the Smithsonian's plan of organization limiting research contribution and diffusion to select "suitable persons," the scientific-minded public continued to imagine the Smithsonian and its scientific work as a direct source for increasing public knowledge and intellectual improvement. The discourse surrounding the early Smithsonian and its activities demonstrates that the process of establishing borders that defined a professional/amateur dichotomy was an uneven one, as the Institution contended with republican expectations of the scientific public and some projects continued to rely upon contributors without formal or elite credentials who in turn demanded accessible and practical research products. Henry's dispute

²³ Valencius et al., "Science in Early America," 82; and Goldstein, "'Yours for Science'," 582.

²⁴ For an in-depth examination of these aspects see Conlin, "Science under Siege."

with his plan's portrayal in the press and his acknowledgement of popular demand for Smithsonian resources as described in his 1850 annual report to Congress indicated that public opinion and popular expectation clashed with early Smithsonian efforts to establish a professional field of science in the United States and remained highly influential in the first decade of the Institution's existence.

Chapter One

Professional Publications and Penny Magazines: Popular Press Discourse Regarding Access to Early Smithsonian Research

Joseph Henry's disinterest in appealing to the general American public, evident in his plan of organization for the Smithsonian, derived from his overall vision for reforming American science. On August 22, 1850, Henry addressed the American Association for the Advancement of Science on the creation of a system of scientific ethics to protect association members and scientific truth from adverse and destructive external influence. He emphasized that legitimation must come from within a small community of specialists rather than received from the wider public.

It should never be forgotten that true reputation must always be based on the favorable opinion of the few in any country who are capable of properly appreciating the labors of him who would claim to have enlarged the bounds of human knowledge, or to have done any thing worthy of commendation by his fellow men. The higher and more abstruse the character of the investigations he professes to have made the smaller is the number of those who are capable of rendering a proper verdict. In this case especially the votes must be weighed, not counted. He therefore who seeks approbation for his labors by appealing to tribunal which from its character and pursuits is not qualified to properly appreciate them is practicing a deception and is justly entitled to the name of a quack.²⁵

Henry promoted review among men with recognized scientific expertise within a particular field to prevent fraudulent work or "quackery." If a researcher was "honorable" and "imbued with the true spirit of science," he would submit his work to "some learned society or to the editor of some scientific journal where they will be scrutinized before they are published and where they will be presented to the eye of men capable of knowing pronouncing on their merits." Amidst his promotion of this system of ethics, Henry simultaneously promoted the complete removal of the

²⁵ "Address to the American Association for the Advancement of Science," August 22, 1850, in *The Papers of Joseph Henry*, vol. 8 (Washington, DC: Smithsonian Institution Press, 1998), eds. Marc Rothenberg et al., 94.

broader public from these processes of legitimate scientific knowledge creation and distribution. He argued that it was necessary for true men of science to be “beyond the appreciation of the multitude.” Rather than consider “the multitude” he would “[scorn] an appeal to ~~any~~ so low a tribunal and would prefer to be the author of a discovery the importance of which but a few men in the whole nation would be capable of ~~judging~~ appreciating.” The only proper role Henry allocated for public newspapers was for the occasional commendation of prominent men of science and only if the source of such popular recognition came from a legitimate scientific publication or the “spontaneous sentiment of some impartial and competent judge.”²⁵ According to Henry, strict adherence to this code of ethics was essential if American science was to overcome its reputation as a democratic instrument for the practical interests of the public rather than a self-regulated field advancing theoretical and abstract inquiry in accordance with European models of science. “It should be the duty of this association to endeavor to establish a standard of American science and to combine to elevate the estimation of an american reputation— We must respect ourselves or others will not respect us.”²⁶ Advancing American science would require creating a wide distinction between the scientific interest of the public and legitimate scientific work.

According to Iwan Rhys Morus’ review of Joseph Henry’s papers and correspondence from 1847-1853, Henry was increasingly interested in reorganizing American science according to more hierarchical European models, “[arguing] that American science had to be the province of an elite. Science according to Henry’s vision could not afford to be a democracy.”²⁷ Historians of nineteenth-century science recognize the time in which the Smithsonian was

²⁶ “Address to the American Association for the Advancement of Science,” August 22, 1850, in *The Papers of Joseph Henry*, 8, eds. Rothenberg et al., 97.

²⁷ Morus, “Henry’s House,” 411-412.

established and developed as a transitional period in which efforts by upper- and middle-class practitioners shifted from legitimization in the public sphere toward a more elite framework of specialization and professionalization.²⁸ Leading men of science, such as Henry, sought to disconnect the process of legitimization from the American public sphere and establish institutions and standards within a centralized, professional scientific community which would internally regulate and legitimize itself.²⁹ No longer accountable to the general population, these advocates for more “pure” and professional science would be able to advance American studies of more abstract theoretical topics alongside lauded European researchers, without having to make their work directly applicable to the practical needs of the public.³⁰ While these efforts eventually established accepted distinctions of “professional” and “amateurs,” American scientists leading this movement first had to open a fissure between science and the public and contend with the public discourse that formed to debate their actions in the context of a republican ideology.

While competing interests within the Smithsonian and the larger politics of Congress challenged Henry’s plan of organization, discourse in the press also influenced and reflected broader public demands on the Institution. Building on institutional histories of the Smithsonian as well as works analyzing the broader history of nineteenth-century science, this chapter explores the public discussion articulated in newspapers, periodicals, and other popular publications surrounding the Institution’s “increase and diffusion of knowledge” mission in the decade after its establishment in 1845. Examining such discourse, which ranged from supporting

²⁸ Kuritz, “The Popularization of Science,” 269; Kohlstedt, *The Formation of the American Scientific Community*; Alexandra Oleson, Sanborn Conner Brown, and Nathan Reingold, “Definitions and Speculations: The Professionalization of Science in America in the Nineteenth Century,” in *The Pursuit of Knowledge in the Early American Republic: American Scientific and Learned Societies from Colonial Times to the Civil War* (Baltimore, MD: John Hopkins University Press, 1976), pp. 33-69.

²⁹ Reingold, “Definitions and Speculations,” 33.

³⁰ Kuritz, “The Popularization of Science,” 266.

Henry's efforts to uplift American science to declarations of the Institution's inaccessibility and uselessness, demonstrates how the wider American public understood scientific work in the United States and how many imagined their relationship with the Smithsonian. The wider scientifically minded American public resisted barriers that prevented their access to scientific knowledge and the exclusion of utilitarian practice from emerging professional endeavors. Despite Henry's articulations of a plan to elevate and professionalize the field, republican ideology embedded in American science continued to dominate the public imagination of the Smithsonian and expectations that everyday citizens were ultimately the legitimate beneficiaries of American scientific work.

Republican Imaginings of the Smithsonian Institution in Public Discourse

Henry's efforts to gain wider public consensus for his plan of organization remained unsuccessful two years after expressing frustration to Congress in 1850 as the press continued to debate the Smithsonian's role within a republican society. On September 30, 1852, the *New-York Daily Times* expressed regret that the United States government failed to provide more financial patronage to scientific work, particularly identifying intellectual exploration and general education as essential to freedom and self-government. Acknowledging the Smithsonian's role in scientific efforts, the article stated that its "heavy publications, which few can afford to buy, and fewer care to read, strike us as the most futile and incompetent means of fulfilling the intentions of the donor." Rather, it seemed obvious to the article's author that Smithsonian's intentions centered on the discovery and distribution of "the great practical truths" of science.³¹

The *Daily Times* envisioned the purpose of the Smithsonian Institution as conducting practical research for the direct benefit of the general American population. In response to a

³¹ "Advancement of Science," *New-York Daily Times*, September 30, 1852, 4, ProQuest.

correspondent's objection to the article, the *Daily Times* defended its position in a follow-up article on October 4th, which argued that Smithson's intensions were not being fulfilled as the Smithsonian thus far "accomplished little or nothing towards disseminating knowledge amongst the people." The piece also called for alterations to the Institution's plan of spending to make the benefits of productive research "direct and inclusive." The article further argued that if the work currently printed within the sizeable Smithsonian publications were truly valuable to the public, commercial publishers would reissue the copyright-free material to meet demand, letting the rapidly growing print capitalist market determine its value. Rather, the Institution produced "nothing but the unwieldy and unpopular refuse of the publisher shop."³²

In direct opposition to Henry's program of formal publications intended for institutional exchange, the October 4th article prioritized direct diffusion of knowledge among the public through the more widely accessible popular press. It argued, "were the revenues of the fund expended and sending publications prepared on the principle of the *Penny Cyclopaedia* or *Magazine*, or *Chambers' Journal*, into every house of the land, at nominal prices, its devotion to the publishing trade would have been excusable."³² The article author imagined the Smithsonian's role in scientific exploration as more directly providing the American people access to publically relevant research and the public's role as determining legitimate research through commercial demand.

The following day, the *Daily Times* published a letter to the editor defending the Smithsonian. The letter's author, who signed with the name "Viator," described the Institution's research endeavors and argued that the value of its scientific work could not be determined by a commercial publisher. Rather, the actual value of Smithsonian research depended on advancing

³² "The Smithson Fund," *New-York Daily Times*, October 4, 1852, 4, ProQuest.

the work of the “[real] scientific inquirers” to whom the Smithsonian distributed its sizable publications. Noting the Institution’s limited funds while the large building mandated by Congress remained under construction, the author also expressed a desire to see the Institution’s operations expanded to diffuse knowledge further upon the completion of the building and the availability of further funding, proposing it go beyond publications in the form of a national university.³³

In response to this letter, the *Daily Times* retracted its stronger statements which had disparaged the Smithsonian publications, calling them “misconceived.” Based on the information provided by the letter to the editor, it praised aspects of Henry’s vision which would advance science, even if indirectly for those outside of professional intellectual communities. The *Daily Times* also outlined activities, such as the Smithsonian meteorological network, which it expected would provide practical and direct benefit to the general population. Rather than blame Henry’s plan, the newspaper turned its criticism to Congress and its requirement that the Smithsonian construct an expensive building and stage a lecture series that was only beneficial to those who lived close to the capital city. According to the *Daily Times*, it was these “indirect and unproductive objects” which obstructed necessary funding for expanded activities.³⁴

Henry noted the *New York Daily Times* discourse in a letter to Asa Gray, notable Harvard professor of botany and Henry’s scientific ally. On November 6-11th Henry reported to Gray that “all the affairs of the Institution are going on smoothly and prosperously notwithstanding the attempts which are made through the newspapers to improve the plan of operation. A few weeks ago a very silly attack was made on us in the [*New York Daily Times*] but in an article of this

³³ Viator, “The Smithsonian Institution,” *New-York Daily Times*, October 5, 1852, 2, ProQuest.

³⁴ “The Smithson Institute.” *New-York Daily Times*, November 2, 1852, 4, ProQuest.

week the editor takes the whole back and commends our exertions.”³⁵ Henry seemingly dismissed any disruption from the widely circulated newspaper calling the Institution’s operations into question. However, Henry had previously been advised by British paleontologist, Gideon Mantell that “it will be necessary if the attacks continue on the Inst to publish some of the letters of commendation.”³⁶ Upon the publication of the *Daily Times* articles in October Henry noted them in his desk diary as “The old complaint. Should publish popular books—”³⁷ Such discourse was part of an ongoing publicity issue and public debate regarding the Institution’s purpose and the legitimacy of Henry’s vision.

Although these opinions were not uncommon in the press, the *Daily Times* series of articles prompted answering opinions in a variety of publications. On October 1, 1852 following the initial article in the *Daily Times*, *The Green Mountain Culturist*, a monthly agricultural and mechanical trade journal published in Middlebury, Vermont, reprinted a section of the *Daily Times* article alongside a description of Smithson and the nature of his bequest. Although it stated that any connection to the deep divisions of party politics which evoked similarly intense positions remained unclear, the journal acknowledged the Smithsonian fund’s allocation thus far as “a subject of much criticism and complaint by many of the most popular publications of the day.” *The Culturist*’s own vision of Smithson’s “unquestionable” intentions stressed that ‘the increase and diffusion of knowledge among men,’ was meant to include all men, of all nations, as well as those of our own country.”³⁸

³⁵ Henry to Asa Gray, November 6-11, 1852, in *The Papers of Joseph Henry*, 8, eds. Rothenberg et al., 400.

³⁶ Gideon Mantell to Joseph Henry, August 10; The year of Mantell’s original letter is not included, but Henry copied the letter to his desk diary on October 10, 1852, in *The Papers of Joseph Henry*, 8, eds. Rothenberg et al., 395.

³⁷ “Henry Desk Diary,” October 10, 1852 in *The Papers of Joseph Henry*, 8, eds. Rothenberg et al., 395.

³⁸ “History and Design of the Smithsonian Institution,” *Green Mountain Culturist* (Middlebury, VT) October 1, 1852, 149, EBSCO.

The *Christian Watchman & Reflector*, a weekly Baptist newspaper published in Boston, weighed in on November 5, after publication of the final *Daily Times* article. In an article, which re-printed an edited and expanded version of the October 5th “Viator” letter, the paper also expressed confidence in the public sphere’s ability to regulate the Smithsonian’s activities as “progress in science always works practically in the end, and partly because the outside presence of the times demanding practical leanings, will sufficiently counterbalance the opposite tendencies of scientific men.” Only if “sufficient pains [were not] taken in the right quarters to communicate information” would the public interest in the Smithsonian trust to the American people not be fulfilled.³⁹

The series of articles instigated by the original *Daily Times* criticisms contained common elements of the debate regarding the role of the Smithsonian during this time period. A strong sense of republican ideology ran throughout the imaginings of the Smithsonian’s legitimate scientific purpose put forth in popular publications as well as smaller journals. Highly critical objections to the Institution, such as the first two *Daily Times* articles, emphasized a perception of the Institution’s failure to serve the needs of the general population, especially through research and mechanisms of publications.⁴⁰ In 1854, *Scientific American* proclaimed “The object of Smithson was the increase and spread of the most useful knowledge among men—democratic knowledge—that which is elevating and beneficial...” The popular science magazine found the Smithsonian only “published a number of abstract works on very unimportant subjects—which are of no general interest whatever.” Finally, the article’s author concluded that while the

³⁹ “The Smithsonian Institution: What Is It Doing?,” *The Christian Watchman & Reflector* (Boston, MA) November 25, 1852, 190, ProQuest.

⁴⁰ Criticism of published material not serving the practical needs of the American people began upon the Smithsonian’s first publication in 1848. The *Scientific American* stated that while “we hope that. such a work may do some good, but so far as true science, and the majority of our people or the people of any other nation will be benefitted by it, we are more than doubtful.” “What to Do with Part of the Smithson Bequest.,” *The Scientific American* (New York, NY) 3 no. 15 January 1, 1848, 117, ProQuest.

Smithsonian “has done a great deal since it was organized... it certainly should have done more, so far as it relates to popular useful science for the millions; that was the object of Smithson in making the bequest— he was a scientific Democrat— or he, an English nobleman's son, never would have left his fortune to found such an Institution in republican America.”⁴¹ An 1854 article in the New York-based Congregationalist magazine, *The Independent*, stated that “[Appealing to] the practical interest and good sense of the people” was the only method by which “to secure to the Institution which has this for its alone object the national enthusiasm.” This article similarly criticized the highly specialized and indirect research supported by the Smithsonian and its less accessible publications, finding such activities “as far as possible from realizing the hopes entertained by the country concerning the Institution.”⁴²

In a letter from an Ohio correspondent published in the Washington, DC abolitionist newspaper *The National Era* in 1852, the writer expressed concern that the Smithsonian publications “fall lamentably short of fulfilling the intentions of its excellent founder.” The letter writer suggests that a better approach to meeting the scientific needs of the people would entail the publication of “an illustrated weekly ‘Smithsonian Journal’-- in some respects a modern ‘Penny Magazine’-- which shall be a faithful register of scientific progress everywhere, and which, by it's lively dissertations upon scientific subjects shall create and supply a thirst for knowledge in general, which shall be alike credible to the Institution and beneficial to the race.”⁴³ Amidst 1853 correspondence to *Gleason's Pictorial Drawing-Room Companion*, a Boston-based weekly literary magazine, Benjamin Perley Poore, a prominent newspaper editor and correspondent, more explicitly identified tension regarding the emerging boundaries of

⁴¹ “The Smithsonian Institute.” *Scientific American* (New York, NY) 9 no. 26 March 11, 1854, 205, ProQuest.

⁴² “The Smithsonian Institution,” *The Independent... Devoted to the Consideration of Politics, Social and Economic Tendencies, History, Literature, and the Arts* (New York, NY) 6 no. 305 October 5, 1854, 305, ProQuest.

⁴³ Almar, “The Smithsonian Institution.-- A Suggestion,” *The National Era* (Washington, DC), April 29, 1852, 72, ProQuest.

scientific professionalism prioritized by the Smithsonian plan and the expectations of the scientific-minded public:

The Smithsonian Institute, by the way, is becoming very unpopular among all visitors here who do not bow the knee to incomprehensible super-erudition. Instead of really ‘diffusing knowledge among men,’ the professors squander the money in supporting fellow pundits, who occasionally print a ponderous volume on... abstruse subjects. These “reports” are liberally sent to Europe, but never seen among the American people, who *might* be largely benefited, in their practical applications, by this fund. Agricultural surveys, chemical investigations, mechanical experiments, or intelligible statistics would do good, instead of the present system of “diffusing knowledge” ...⁴⁴

The extensive demand for the Smithsonian to provide publications of its research for popular consumption highlighted the republican and utilitarian expectations for American scientific practice and the Institution’s imagined purpose. In 1855, St. Joseph, Missouri resident John Grable and “sundry others” signed a petition to Congress “praying for the publication of a monthly periodical, exhibiting the progress of knowledge and of society, and to be distributed by [the Smithsonian Institution] among the people.”⁴⁵

Even several newspapers and journals expressing staunch support for the Smithsonian and its efforts to increase knowledge primarily through formal intellectual networks assured readers that a more direct popular publication for the purpose of facilitating public access to research was forthcoming. While providing a summary of the Smithsonian’s history and activities in February 1852, *Norton’s Literary Gazette and Publishers’ Circular*, a New York-based periodical for the American publishing industry, included “it is proposed, also, to publish for still wider circulation, a monthly ‘Bulletin.’”⁴⁶ The periodical firmly backed the Institution

⁴⁴ Benjamin Perley Poore, “Waifs from Washington No. VII,” *Gleason’s Pictorial Drawing - Room Companion* (Boston, MA) 4, no. 8 February 19, 1853, 123, ProQuest.

⁴⁵ House of Representatives, Select Comm. on the Management of the Smithsonian Institution, *Journal of the Committee*, H.R. Rep. No. 141, 33rd Cong., 2nd sess., at 3 (1854-44).

⁴⁶ “Smithsonian Institution,” *Norton’s Literary Gazette and Publishers’ Circular* (New York, NY) February 15, 1852, 1, EBSCO.

and its plan of organization and its publications plan, disparaging criticism in a May 1852 article, finding “it is really surprising to see what erroneous ideas even men of intelligence, and various parts of our country, have formed in regard to the plan and objects of the Smithsonian Institution.” Like the “Viator” letter, *Norton’s Literary Gazette* pointed to limitations of the Institution’s funding and praised the wisdom of applying funds selectively. “It cannot do *everything* which is necessary for ‘the advancement and diffusion of knowledge among men;’ and the greater number of interests it attempts to advance, the less they can do for each one.” Instead, the *Gazette* recounted the various accomplishments and activities described in the 1850 *Annual Report of the Board of Regents* and reassured its audience that “in regard to the Smithsonian Institution, and its general operations the public have every reason to be gratified at the skillful, practical, and scientific manner in which its affairs are conducted, and to place confidence in the wisdom and ability of those who are its managers.”⁴⁷ Such claims of a planned pamphlet series or bulletins for wider distribution appear unfounded, however, as their potentiality were never affirmed in the Smithsonian’s *Annual Reports*. Rather, Henry had stated in his report for the year 1851 that printing popular tracts was financially untenable and at odds with the purpose of the Smithson fund:

The idea is still generally entertained that Smithson bequeathed his property to this country for the diffusion of useful knowledge among the people, and that his intention would be best consulted by the expenditure of all the income in the publication and general distribution of tracts on practical subjects. The adoption of this plan would be to dissipate the funds without beneficial effect. ... The property, however, was not left to the inhabitants of the United States, but to the government, and trust for the good of man; And not merely for the dissemination or diffusion of knowledge, but, first of all, for creating, originating, increasing it.⁴⁸

⁴⁷ “The Report of the Smithsonian Institution,” *Norton’s Literary Gazette and Literary Circular* (New York, NY) May 15, 1852, 84, EBSCO.

⁴⁸ Smithsonian Institution, *Letter from the Secretary of the Smithsonian Institution Communicating the Annual Report of the Board of Regents* (1852), 10 (hereafter cited as SI, *Sixth Annual Report*).

The House committee which reviewed the petition of John Grable and other citizens of St. Joseph, Missouri aligned with Henry and dismissed the feasibility of compiling a publication that could satisfy the varying intellectual demands of Americans.⁴⁹

Although the aspects of the Smithsonian most criticized in newspapers and periodicals during this time involved key parts of Joseph Henry's program of organization, most publications, even highly critical ones, often did not assign fault to Henry, but rather blamed Congress. For the most part, Henry enjoyed a favorable reputation in the press, which viewed him as scientist seeking to elevate American science and the intellect of Americans with it. The November 2 *Daily Times* article retracted its heaviest criticisms of the Institution and clarified that its censure was not aimed at Henry, who should instead be recognized with "hearty encouragement and applause" for his "eminently judicious" actions in spite of Congress. Although the article pointed to aspects of Henry's plan that limited direct research and information dissemination as the source of offence, it found these "objectionable features of the system are due to the stupid policy of Congress," specifically blaming the congressional requirement for a construction of a large costly building. "If the revenues of the bequest are wasted on indirect and unproductive objects, they are so in spite of every remonstrance to the contrary."³⁴ The extended "Viator" letter published in the *Christian Watchman and Reflector* recognized Henry's protest against the building construction and posited that "the Institution would gladly publish more matter, practical as well as abstract and in larger quantity, but it has no options as to expenditures. Congress has ordered the erection of an expensive building, and the accumulation of a library, museum, and gallery of art." The newspaper speculated further

⁴⁹ House of Representatives, Select Comm. on the Management of the Smithsonian Institution, *Journal of the Committee*, H.R. Rep. No. 141, 33rd Cong., 2nd sess., at 18 (1854-44).

that “when the ridiculous buildings are completed which Congress has ordered, a much larger sum will be at the control of the Regents for the legitimate purpose of the Institution.”³⁹

In his annual reports to Congress Henry attempted to situate the Smithsonian as an institution autonomous from regulation by the American public and severely limited by funds held in trust by Congress. Henry continuously reminded his audience the bequest was left to be held in trust by the United States government for the founding of an institution “for all mankind,” not necessarily the American public.⁵⁰ He also sought to mitigate public demands on the Institution by emphasizing the financial limits of the Smithson bequest, outlining the required expenditures enacted by Congress and addressing demands for broader publications. According to his 1853 report, within the Smithsonian budget, “a single pamphlet of ten pages could not annually be printed by the Institution, and distributed to all who would have a claim to it.”⁵¹

In addition to limited funding, Henry’s larger mission to organize and install boundaries in the field of science characterized the Secretary’s lack of public prioritization in the Smithsonian’s *Annual Reports*. Rather, the Institution funds were better dedicated to “[stimulating] all persons in this country capable of advancing knowledge by original research.” The “capable” research published would be limited by “competent judges, who vouch for the value and truth of the discoveries,” and distributed among “first class libraries,” colleges, and “well established public institutions.” Almost in direct response to the initial *Daily Times* criticism and in opposition to popular demands for practical and accessible works, Henry’s 1854

⁵⁰ SI, *Sixth Annual Report*, 10; Smithsonian Institution, *Eighth Annual Report of the Board of Regents of the Smithsonian Institution Showing the Operations, Expenditures of the Institution, and Conditions of the Institution Up to January 1, 1854, and the Proceedings of the Board up to July 8, 1854* (1854), 121 (hereafter cited as SI, *Eighth Annual Report*).

⁵¹ SI, *Eighth Annual Report*, 122.

report asserted, “the higher the value of a work of science, the fewer do its readers become. If writers wish to make money by their labors, they must publish novels.”⁵²

These conflicting frameworks of American science and the purpose of the Smithsonian bequest conspicuously recurred in popular discourse in the middle of the nineteenth century, so much so that the 1855 publication, *The American Debater: Being a Plain Exposition of the Principles and Practice of Public Debate*, considered the issue prominent enough for debating societies and acknowledged it in its list of provided questions. The publication put forth the prompt, “Has the Smithsonian Fund been employed in a manner accordant with the intention of the donor?”⁵³ Despite the vision articulated by Henry in his annual reports to Congress, the popular press continued to expect scientific institutions to align with frameworks of public scientific culture and imagined the early Smithsonian as a republican institution of science for the people. While the press interpreted limited scientific resources for public improvement as a government issue, such pushback in the public sphere required that Henry constantly defend and articulate his definition of the Institution’s professional priorities and aspirations, as he did once again at the beginning of his 1854 address to Congress:

The managers are overwhelmed with suggestions, and subjected to illiberal criticisms, and unless they are firmly convinced of the propriety of their course, and have sufficient moral courage to pursue it notwithstanding opposition, there is danger of vacillation, and of an attempt to gain popularity by adopting measures not calculated to promote the desired end. It should, however, be recollected that opinions ought to be weighed rather

⁵² SI, *Eighth Annual Report*, 123; Henry did attempt to enable wider re-publication of Smithsonian research by waiving exclusive rights to the articles in the Smithsonian’s publications. He later began including full editions of the Smithsonian Contributions to Knowledge in the Annual Reports, obligating the government to print and distribute the research as a matter of public record. For the early Smithsonian’s publication rights policy, see SI, *Fifth Annual Report*, 15; for Henry including research articles in the Annual Reports, see Marc Rothenberg et al., eds., *The Papers of Joseph Henry*, vol. 9 (Canton, MA: Science History Publications, 2002): xxv.

⁵³ James N. McElligott, *The American Debater Being a Plain Exposition of the Principles and Practice of Public Debate ...* (New York: Ivison & Phinney, 1855), 220.

than counted, and that nothing of importance can be accomplished either by an individual or an institution, except by constant and laborious exertion in one direction.⁵⁴

Demands of the Agricultural Public on Smithsonian Resources

American farmers and agricultural associations comprised one facet of the broader decentralized scientific community which frequently made demands upon the early Smithsonian Institution. The agricultural press invoked the language of republican science to argue for greater government resources dedicated to advancing the more practical field of agricultural science—often calling for a national agricultural school to be developed through the Smithsonian funds. In the midst of an American economy that was shifting from traditional agricultural domination to a wider market economy driven by industry, agricultural science was promoted by these journals as a method of confronting and surpassing industry with a more advanced agricultural sector.

Even while Congress debated the establishment of the Smithsonian Institution, agricultural journals began claiming the creation and diffusion of agricultural knowledge as the most legitimate use of the Smithsonian fund.⁵⁵ Less than a year after Congress passed the 1846 act establishing the Smithsonian, the *Monthly Journal of Agriculture*, published in New York by Greeley and McElrath and edited by John Stuart Skinner, expressed an optimistic feeling of rising national support for the advancement of practical agricultural science and conveyed “strong hopes that, in the learned Secretary of the ‘Smithsonian Institute,’ Agriculture will have an advocate duly impressed with a sense of its paramount importance, and with the exceeding

⁵⁴ SI, *Eighth Annual Report*, 9.

⁵⁵ “Agricultural Department.: Our Anti-Agricultural System.,” *Boston Cultivator* 3, no. 47 November 20, 1841, 1, ProQuest.

usefulness of all knowledge that may serve to enlighten its practice in the field, and to place it where it deserves to stand, in the front of our industrial occupations.”⁵⁶

However, by 1852, the Institution’s de-prioritization of practical, republican science in favor of the more theoretical and abstract fields of the specialized professional model diminished this sense of optimism.⁵⁷ In an article regarding judicious measures for improving agriculture, John Stuart Skinner’s successive farming and mechanics journal, *For the Plough and the Loom and the Anvil* stated, “agriculture, the first and noblest of arts, and the highest embodiment of practical science... is almost wholly neglected for the crowded arena of professional and commercial life.” Criticisms that the Smithsonian failed to directly serve the practical, scientific interests of the people circulated in the general press at the time and also permeated agricultural journals, as the writer of *For the Plough* pessimistically wrote, “could not the interest on the funds of the Smithsonian Institution be brought in some way to bear upon this subject, instead of remaining, as they now are, useless to the great body of the people?”⁵⁸

The discourse and demands of the agricultural public sphere found more politically influential proponents than the varying and broad demands put forth in the general press. On June 28, 1852, around the time *For the Plough* published its article, the National Agricultural Convention convened in the Smithsonian Institution’s lecture room. Convention discussions were closely noted for publication in the *Weekly National Intelligencer* newspaper, a Whig leaning publication which reported on Congress and political activities of Washington. A topic of

⁵⁶ “Agricultural Education.: Progress of Public Opinion-- Indications of a Favorable Change,” *Monthly Journal of Agriculture* (New York, NY) 2, no. 9 March 1847, 393, ProQuest.

⁵⁷ A later critical article published by the *New York Daily Times* in 1854 cites a multitude of Smithsonian publications on more specialized topics such as algae species and seaweed cell structures, laws of magnetism and electricity, and studies of flood tides were deemed as too abstract with little direct relation or provided product for the general population outside of elite scientific circles, see “The Management of the Smithsonian Institute. From our Regular Correspondent.,” *New York Daily Times*, March 17, 1854, 2, ProQuest.

⁵⁸ “What Are the Most Judicious Measures to Improve the Agriculture of Our Country,” *For the Plough, the Loom, and the Anvil* (Philadelphia, PA) 4, no. 12 June 1852, 732, ProQuest.

prominent discussion involved demands for greater government resources to support the growth of agriculture. U.S. Senator Stephen A. Douglas of Illinois weighed in on this discussion at the convention, discouraging the enactment of a government agricultural department or bureau which would be vulnerable to the tides of politics. Instead, in alignment with ideas transmitted in agricultural journals, Douglas proposed the Smithsonian take on an agricultural department, which would in turn aid the Institution in more accurately fulfilling Smithson's intentions. According to Douglas, as described by the *Intelligencer*, the Institution's current activities did not align with those intentions:

‘There were now no practical results: abstruse and theoretical subjects were all the professors busied themselves about; and, unless this state of affairs were reformed, the Institute would become most odious in the sight of the American people.’ If it was the wish of the friends of the Smithsonian Institute to make their establishment popular, they must rest it upon the great industrial institutions of the country. [Douglas] wished the Institute to prosecute the sciences, but only with reference to practical results.⁵⁹

This was not the first time Douglas denounced the Smithsonian's present operations, either. Douglas put forth similar remarks in an impromptu address before the Maryland State Agricultural Society the previous year. Upon reading Douglas's earlier statements that the Smithsonian activities were not of a “useful character,” and that the Institution should prioritize agricultural science and publications rather than abstract experiments, Henry commented in a letter to American diplomat and fellow man of science, George Perkins Marsh, “I have said in answer that if the highest craving of the human soul were confined to the desire for good potatoes this might be true.”⁶⁰

⁵⁹ “National Agricultural Convention,” *Weekly National Intelligencer* (Washington, DC), June 26, 1852, 4, *Chronicle America*, Library of Congress.

⁶⁰ Joseph Henry to George Perkins Marsh, November 18, 1851, in *The Papers of Joseph Henry*, 8, eds. Rothenberg et al., 261.

Douglas was aware of Henry's presence at the 1852 National Agricultural Convention where he repeated his censure of the Smithsonian, and according to Henry in a later private letter, "his remarks were well calculated to excite me and to do away with my usual reluctance to speak in public."⁶¹ Henry quickly defended his plan against the condemnations hurled by Douglas and the agricultural press. According to the *National Intelligencer* article, he explained to the convention that the Smithson bequest was widely misunderstood. "It was not merely useful knowledge, in the general acceptance of the word, that he contemplated the increase and diffusion of, but he had high objects, expanded, and elevated purposes, for he was a man of much acquisition and research..." Rather than intending to provide practical knowledge to Americans, the bequest intended a more elevated mission that directed organized research be spread throughout the world by diffusion through intellectual institutions. Henry further defended the perceived misuse of the Smithsonian funds by pointing to the expensive building imposed by Congress in limiting its activities. He concluded by firmly communicating his own thoughts on incorporating an agricultural scheme into the Smithsonian. "As for the plan which had that evening been enclosed, to make the Institution an Agricultural Society, [Henry] would rather blow it up, and send the funds back to Chancery of England, from which they came, that it should be adopted."⁵⁹ Afterwards, in a private letter, Henry expressed, "I fear [I] was rather severe in my remarks." However, he found that overall, he made his points well and that "Judge D. found he had made a mistake."⁶¹

The political strength of the agricultural community's demands on the early Smithsonian for increased distribution of practical scientific work requires further consideration of the power and influence wielded by Southern plantation interests. While many of the journals promoting

⁶¹ Joseph Henry to fellow man of science, Alexander Dallas Bache, June 25-July 9, 1852, in *The Papers of Joseph Henry*, 8, eds. Rothenberg et al., 344.

agricultural science were published in Northern free states, advancing agricultural science in the United States was also viewed by slaveholders in the South as essential increasing cotton production as far as biology would allow and developing highly efficient. Historian Walter Johnson describes the persistence at which reform-minded planters sought out new discoveries in agricultural science to establish greater control over both the land, its labor, as well as the larger economy.⁶² Douglas, however, hoped to avoid ensnaring national efforts for agricultural development in wider politics, foregoing mention of cotton in favor of corn, despite his proxy ownership of a large cotton plantation in Mississippi.⁶³ The extent of Southern slaveholding agricultural interests and their demand for national resources to develop practical agricultural science and, in particular, the political influence Southern slaveholding interests might have had on the Smithsonian's activities has yet to be fully explored.

While the heated debate of the National Agricultural Convention did not result in the Smithsonian's transformation into an agricultural society, the agricultural press continued, even two years later, to push such expectations and argue for farming interests as the most relevant use of the funds for Americans. In 1854, John Stuart Skinner's Baltimore-based national periodical, *The American Farmer*, published an address made before the Maryland State Agricultural Society which directly followed up on the issues of the 1852 convention. The speaker lamented that "our interest has no such footing in the Government as it deserves, and is entitled to," and demanded a government department and national agricultural school to meet the information needs of farmers. According to him, "the favorite plan for an Agricultural College and model farm seems to be connected with the Smithsonian Institute." This plan portrayed the

⁶² Walter Johnson, *River of Dark Dreams: Slavery and Empire in the Cotton Kingdom* (Cambridge, MA: The Belknap Press of Harvard University Press, 2017), 180-183.

⁶³ Martin H. Quitt, *Stephen A. Douglas and Antebellum Democracy* (New York: Cambridge University Press, 2012), 191.

Smithsonian as inherently tied to this vision as “the desire of the benevolent testator was to ‘diffuse knowledge among men,’ and to no class is it more necessary than to our youth adopting the pursuit of Agriculture—and to none could it be extended who could return fruits more likely to scatter blessings over the land.”⁶⁴

Pointing to agricultural experimentation and study as one of the most practical applications of science, agricultural publications considered their demands on the Smithsonian as legitimate based on republican notions of science. Such publications used this ideological alignment to argue in the public sphere for greater government resources, which included those of the Smithsonian, dedicated to agricultural education and research. While Stephen Douglas later dismissed his dispute with Henry at the National Agricultural Convention as a misunderstanding, the incident demonstrated that the demands on the Smithsonian’s resources articulated in the agricultural press carried political weight, and in conjunction with continued wider public dissatisfaction, could not be entirely ignored by Henry in his activities.

The Smithsonian Library Controversy and Heightened Discourse in the Press

While the Congressional act establishing the Smithsonian mandated that the Institution include a library, museum, and art gallery, Henry increasingly viewed these aspects as “incompatible with the limited income of the Institution.”⁶⁵ In 1853 Henry approached the Board of Regents, the Congressional mandated group that, with the Secretary, governed the Smithsonian, to renegotiate the Institution’s budget, which required half of the annual funds be dedicated to the museum and library while the other half could be used to support Henry’s

⁶⁴ Samuel P. Smith, Joynes, Thos. R. Jr., and Walsh, Jno Carroll, “Address of C.P. Holcomb, Esq. before the Md. State Ag. Society,” *The American Farmer, a Monthly Magazine of Agriculture and Horticulture* (Baltimore, MD) 9, no. 7 January 1854, 201, ProQuest.

⁶⁵ Henry to Asa Gray, April 26, 1853, in *The Papers of Joseph Henry*, 8, eds. Rothenberg et al., 437.

research and publication program.⁶⁶ Henry asserted that the Congressional act's fundamental purpose was to fulfill Smithson's intentions, not to strictly enforce the vision of the Institution held by Congress.⁶⁷ In the Smithsonian's *Annual Report* published in 1852, Henry countered the broad Congressional interpretation and argued Smithson actually intended to establish an elite research institution, comparable with the Royal Society of London.

The encouragement of the discovery of new truths, the publication of original memoirs, and the establishment of new researches, are in conformity with the design of Smithson, is not only manifest from the terms of his will, but also from the fact, which has lately come to our knowledge, that he had first left his property to the Royal Society of London, for the very object embraced in this part of the plan.⁴

In his 1853 appeal to the Regents, he sought to limit the library to necessary reference materials and the museum to temporary research collections which would support the "active" operations. This plan for a circumscribed library and museum would provide Henry with greater flexibility in the budget to grow his vision of Smithsonian as an elite, professional research institution.⁶⁶

However, Charles Coffin Jewett, the Smithsonian Assistant Secretary and librarian held a contrasting vision. While Henry argued that Smithson intended the Institution to create and diffuse knowledge via publications, Jewett sought to build the Smithsonian into a national library and leading institution of library science.⁶⁸ Jewett vehemently opposed the diminished library

⁶⁶ Rothenberg et al., *The Papers of Joseph Henry*, 9: xiv-xv.

⁶⁷ Henry argued "The intention of the Legislature as a whole is to be gathered from a comparison of the several parts of the law itself, and from the evident object for which it was enacted. Now what was the object of the law relative to the Smithsonian bequest? Evidently to carry out the will of Smithson namely: 'to increase and diffuse knowledge among men.' It was therefore proper to consider whether the interpretation of the law which would restrict the application of the income to the collection of a library and museum, would fully carry out this intention. Though a library and museum may be considered as means of increasing and diffusing knowledge among men they cannot be regarded by any proper interpretation of the terms, as accomplishing in themselves the object intended. They are among the implements for producing a desired end, but not the end itself. It could not be supported that Congress after a critical examination of the will could have regarded the Library and Museum other than aides in accomplishing the objects in view and therefore it became necessary to inquire whether the law itself did not admit of an interpretation more in accordance with the intention of the testator than that which would restrict the expenditures to these objects;" Henry', "To the Special Committee of the Regents of the Smithsonian Institution," March 29, 1854, in *The Papers of Joseph Henry*, 9, eds. Rothenberg et al., 30-31.

⁶⁸ Rothenberg et al., *The Papers of Joseph Henry*, 8: xxiv.

budget proposed by Henry and viewed it as a legal violation of the act passed by Congress establishing the Institution. Upon the Board of Regents' January 1854 decision to side with Henry and dissolve the budget which reserved half of the Institution's budget for museum and library operations, anonymous protesting letters to the editor began appearing in the *Washington Sentinel*, a Democratic daily political newspaper. The conflict between the two factions moved to the arena of the popular press—further stoking public debate regarding the legitimate mission of the Institution.⁶⁹

The initial *Sentinel* letter called into question the regents' authority for disregarding the requirements of Congress. "Being a plain, common sense man, I wish to ask whence the board of regents derive the right to expend the money of the Institution in publishing the luxurious volumes, which we hear of, bearing the imprint of the Institution, and distributed with stately liberality to the 'principal libraries' of Europe and America."⁷⁰ The letter's anonymous writer used the pseudonym "One 'Among Men'," in reference to Smithson's bequest for the "increase and diffusion of knowledge among men," stressing his representation of the general public to whom the Smithsonian publications were largely inaccessible.

An answering letter, signed with the pseudonym "Jamblicus" (in reference to an ancient philosopher) defended the publication program, arguing that it had "contributed so much to advance the American name" and won the Institution a high reputation in foreign countries, with "illustrious and scientific men and bodies," and even among "some of the crowned heads of Europe." Jamblicus closely recited Henry's arguments that the publication program derived its

⁶⁹ While the exact identities of the clashing letter authors published in the January 1853 editions of the *Washington Sentinel* are not known, they closely adhere to Henry and Jewett's arguments; Rothenberg et al., *The Papers of Joseph Henry*, 9: xix-xx.

⁷⁰ One "Among Men," "For the Sentinel. The Smithsonian Institution.," *Washington Sentinel*, January 18, 1854, 2, *Chronicling America*, Library of Congress.

primary legitimacy from the will of Smithson himself and referred to the library simply as a recommendation among many other Congressional suggestions for the fund.⁷¹

In a secondary letter to the *Sentinel* editor, “One ‘Among Men’” derided Jamblicus and more directly claimed that the publication program was elite and aristocratic and completely neglected the wider, legitimate recipients of knowledge designated by Smithson in his bequest. “The [Smithsonian Contributions to Knowledge] are beautiful and costly books, fit for the presentation to ‘learned bodies’ and ‘crowned heads;’ no doubt containing great, various, and useful information, accessible only to the wealthy and favored, utterly worthless and totally unknown ‘among men.’”⁷² The debate caused by the revision of the Smithsonian’s budget existing criticisms of the inaccessibility of Smithsonian research and discourse in the popular press regarding who the Institution should directly serve.

Although the *New York Daily Times* had previously published similar criticism, following the *Sentinel* articles, the library controversy rekindled the issue of the Smithsonian publications’ wider inaccessibility. In March 1854, a regular Washington correspondent for the *Daily Times* questioned Henry’s prioritization of the publications program and its overall value. While clarifying that a library may not pose the best use of the funds, the correspondent determined that “if the researches, the minutiae of which are detailed in these publications, belong to what may be called the aristocracy of science, and are calculated rather to amuse the man of finished fortune and education, the country in these practical days will be apt not to agree altogether with Prof. Henry’s views of the best mode of carrying out the design of Smithson. ...” After listing several of the Institution’s published articles and finding them unbeneficial to the larger

⁷¹ Jamblicus, “To the Editors of the Sentinel,” *Washington Sentinel*, January 21, 1854, 2, Chronicling America, Library of Congress.

⁷² One “Among Men,” “The Smithsonian Institution.,” *Washington Sentinel*, January 28, 1854, 2, Chronicling America, Library of Congress.

population, the article's author further emphasized the elitism and ideological divergence of the Smithsonian and its abstract publications with American society. "It has long been likened to old Royal societies, who patronize only *respectable* subjects, such as do not interest one person in a thousand. Our age demands more practical and productive knowledge." Rather, the author proclaimed that the Institution should pursue work from eminent men of science that was both "democratic and useful," particularly mechanical and agricultural science. "The complaint that, while every class of citizens has claims on it, its benefits are confined to a few individuals, is an old one, is tenable, and is increasing."⁷³ Alongside his own criticism of the publications, the correspondent recognized that while this debate was by no means novel, it appeared to be expanding.

Discourse surrounding the library controversy further intensified after Henry fired Jewett in July 1855.⁷⁴ While Henry's authority to fire the assistant secretary was upheld by the Board of Regents' majority, Jewett's ally, Senator Rufus Choate resigned from the board in protest. His letter of resignation was read before the Senate and House of Representatives, prompting an investigation by a House Select Committee into whether the Smithsonian had been "managed and its funds expended in accordance with the law establishing the Institution."⁷⁵ Jewett's firing and Choate's resignation were reported nationally, inciting discourse regarding the library and the authority of Henry and the Board in "no fewer than sixty newspaper articles" within three months of Choate resigning.⁷⁶

⁷³ "The Management of the Smithsonian Institute. From our Regular Correspondent.," *New York Daily Times*, March 17, 1854, 2, ProQuest.

⁷⁴ Rothenberg et al., *The Papers of Joseph Henry*, 9: xix.

⁷⁵ For Choate's resignation, see Rufus Choate to Jesse D. Bright and Linn Boyd, January 13, 1855, in *The Papers of Joseph Henry*, 9, eds. Rothenberg et al., 175-177; For the description of the Special Committee investigation see House of Representatives, Select Comm. on the Management of the Smithsonian Institution, *Journal of the Committee*, H.R. Rep. No. 141, 33rd Cong., 2nd sess., at 3 (1854-44).

⁷⁶ Rothenberg et al., *The Papers of Joseph Henry*, 9: xx.

In their ninth volume of Henry's published papers, Smithsonian historians Rothenberg, et al. depict these press attacks as generally criticizing the Smithsonian as "an elitist institution controlled by a small, self-interested clique that scorned democratic procedures and ideals."⁷⁷ They describe a December 2, 1854 article in the *Daily Missouri Democrat* that framed the library controversy as "a clash between monarchal and republican values." The article called for Henry's absolute monarchical powers as secretary to be reduced and greater independence granted to individual Smithsonian departments to attain republican "harmony" at the Institution.⁷⁸ The *New York Daily Times* published an article on January 19, 1855 promoting further congressional investigation into the Smithsonian. "If Mr. Choate is right, violence has been done to the law, and... a scientific dictatorship has been established... the usefulness of the Institution must be greatly impaired so long as public opinion is divided upon, and distrustful in relation to, its management."⁷⁹ Henry accused Jewett and his allies as directly supplying several of these attacks to the papers, however, Jewett countered Henry's accusations and denied playing any essential role in instigating the debate. Rather, he claimed that it was Henry's plan that had incited opposition.⁸⁰

Preparing to defend his interpretation of Smithson's bequest and the act establishing the Smithsonian before Congress, Henry wrote to the American geologist, James Dwight Dana that "I would rather sink with the good opinion of the few than swim with the approbation of the

⁷⁷ Rothenberg et al., *The Papers of Joseph Henry*, 9: xxi.

⁷⁸ Rothenberg et al., *The Papers of Joseph Henry*, 9: 161n.

⁷⁹ "Latest Intelligence by Telegraph to the New-York Daily Times. National Affairs. The Smithsonian Institution. Resignation of Rufus Choate. Interesting Debate. ...," *New-York Daily Times*, January 19, 1855, 1, ProQuest.

⁸⁰ For Henry's accusations, see House of Representatives, Select Comm. on the Management of the Smithsonian Institution, *Journal of the Committee*, H.R. Rep. No. 141, 33rd Cong., 2nd sess., at 109 (1854-44); For Jewett's counterattack, see House of Representatives, Select Comm. on the Management of the Smithsonian Institution, *Journal of the Committee*, H.R. Rep. No. 141, 33rd Cong., 2nd sess., at 121 (1854-44).

rabble.”⁸¹ In March 1855, the House Select Committee concluded its investigation in favor of Henry and the Board of Regents’ authority to allocate the Smithsonian’s funds according to their interpretation of Smithson’s original intention.⁸² However, while Henry was vindicated by Congress and his power as secretary expanded, the volatile discourse during the library controversy magnified existing popular debate regarding his plan of organization in national newspapers and he remained agitated by ongoing dispute in the popular press.⁸³

Continued Reliance on Expanded Scientific Networks and Providing Practical Scientific Meteorological Research

Despite the furor in the press, the “active” elements of Joseph Henry’s plan were not actually completely disconnected from the more expansive community of American science and practical research. The Smithsonian Institution’s meteorological observation project was one activity in which the Institution’s research work appealed directly to the sense of republicanism instilled in the scientifically minded American public sphere. Initiated in 1848, Henry recruited volunteer correspondents from across the country and its adjoining territories to calculate and collect various data on the daily meteorological occurrences in their locality and transmit the information via mail or by telegraph to the Institution. These volunteers held a variety of occupations and educational backgrounds as well as varying interests in and objectives for conducting scientific work. Enthusiasm for the project grew the network to several hundred volunteers within the decade.⁸⁴ For Henry, this vast series of data would provide answers to

⁸¹ Henry to James Dwight Dana, January 19, 1855, in *The Papers of Joseph Henry*, 9, eds. Rothenberg et al., 129.

⁸² Rothenberg et al., *The Papers of Joseph Henry*, 9: xxi-xxii.

⁸³ Rothenberg et al. describe several ongoing concerns for Henry and disruptions to Smithsonian operations caused by the library controversy, Rothenberg et al., *The Papers of Joseph Henry*, 9: xxii-xxiii.

⁸⁴ Goldstein, “‘Yours for Science,’” 595. Goldstein’s work concerns the Smithsonian correspondents’ network from the late 1840s-the late 1870s and correspondence from early meteorological network members to support his argument. For source discussion of the correspondents’ network, see Goldstein, “‘Yours for Science,’” 576. For source discussion of the meteorological network, see Goldstein, “‘Yours for Science,’” 587; See the Smithsonian’s

pressing questions on abstract scientific laws governing weather phenomena, including the origins of storms, a topic heavily debated in the more theoretical scientific community.⁸⁵

However, accomplishing such research required more direct accountability to and reliance on a broader field of scientifically minded Americans with more practical interests and republican values, overlapping and complicating the boundaries of Henry's vision of professional science with the public sphere's concept of accessible and utilitarian science.

While other aspects of Henry's program of activities provoked strong opposition and prompted further discourse in the press, the Smithsonian meteorological project received widespread support and enthusiasm from the public sphere. For example, in the November 2, 1852 retraction of their more scathing remarks, the *Daily Times* described the meteorological project as helpful and admitted, "these practical experiments deserve more consideration than they receive in our estimates of the value of the Institution."³⁴

Defenders of the Smithsonian seized upon the example of the meteorological project as proof of the Institution's success in fulfilling its mission. The expanded "Viator" letter argued that "the Smithsonian Institution has always been ready and active in aiding the general interests of science. The single subject of meteorology will serve as an example."³⁹ To further legitimize the project's work and that of the Smithsonian at large, these articles mentioned that the meteorological research encompassed the entirety of the United States, including areas of its western territories, and that men (and women) from all over the Union were receiving the necessary instruction and tools to conduct this research. According to an extremely favorable and

Fourth Annual Report for earliest published list of correspondents, Smithsonian Institution, *Fourth Annual Report of the Board of Regents of the Smithsonian Institution to the Senate and House of Representatives, Showing the Operations, Expenditures, and Condition of the Institution During the Year 1849* (1850), 27-31 (hereafter cited as SI, *Fourth Annual Report*).

⁸⁵ Conlin, "Science under Siege," 66-67.

lengthy article titled, “The Smithsonian. Its Legitimate Mission,” published in *Putnum’s Monthly Magazine of Literature, Science, and Art* “at the present moment, several hundred observers are distributed over the entire continent, more or less being in every State in the Union, all of whom have been supplied with new and superior tables and directions for observing, and many of them accurately compared with instruments.”⁸⁶ Not only was this work viewed as highly practical in assisting Americans with discovering an order and predictability to weather phenomenon that influenced them daily, scientific research was being conducted and shaped by Americans in every state for the benefit of the entire country.

The enthusiasm for and strong demands on the meteorological project existed from the early years of the project as well. *The Genesee Farmer*, a popular agricultural periodical published monthly from Rochester, New York, reported in 1855, “we have done what we could to induce the intelligent and patriotic gentlemen connected with the Smithsonian Institution to give their admirable and extensive meteorological records an agricultural direction.”⁸⁷ In fact, the project likely found greatest support from the agricultural community as Daniel Goldstein’s data notes the high participation of agriculturalists in his comprehensive analysis of Smithsonian correspondents’ occupations in 1875—agriculture made up the second largest category behind medicine.⁸⁸

Joseph Henry recognized the importance of the project’s practicality to Americans while he recruited correspondents across the country and, in particular, how the increased knowledge of weather systems would benefit agriculture. In an 1855 letter to the governor of Maine, which was of wider interest and subsequently published in the *Friends’ Intelligencer*, a Philadelphia

⁸⁶ “The Smithsonian Institution.: Its Legitimate Mission.,” *Putnam’s Monthly Magazine of American Literature, Science, and Art* (New York, NY) 4, no. 20 August 1854, 1, ProQuest.

⁸⁷ “Agricultural Meteorology,” *The Genesee Farmer* (Rochester, NY) 15, no. 2 February 1854, 41, ProQuest.

⁸⁸ Goldstein, “Yours for Science,” 585.

Quaker periodical edited by anti-slavery advocate Isaac T. Hopper, Henry requested Maine dedicate funds to a state meteorological observation system, declaring, “there is no subject of more general popular interest than that of the changes of the weather...” Straying from appreciating the value of this work from a “purely scientific point of view,” Henry emphasized that “the facts which they reveal are directly applicable to the wants of the husbandman; they aid in enabling him to predict, without a ruin a series of trials, what plants he can safely cultivate, or what animals he may succeed in rearing.”⁸⁹ Earlier that year, Henry published an article through the Patent Office titled “Meteorology in its Connection with Agriculture,” which derided practical agricultural science while simultaneously allying it with his vision of formal and abstract science.

The hopes of the future, in regards to agriculture, principally rest upon the advance of abstract science-- not upon the mere accumulation of facts... but upon a definite conception of the general principles of which these facts are the result. All the phenomena of the atmosphere should be studied and traced to the laws on which they depend. The labor bestowed upon investigations of this kind is not as, the narrow-sighted advocate of immediate utilitarian results would affirm, without practical importance; On the contrary, it is the basis of the highest improvement of which the art of agriculture is susceptible.⁹⁰

The legitimacy bestowed on the meteorological project by the public sphere and the weight of agricultural demands on its research influenced its development and the process by which its results were published. The popularity of the meteorological project did not, however, mean that critiques of Henry and his plan for the Smithsonian dissipated. Nor did the project unfold entirely according to his intentions. Indeed, as historian Michael Conlin describes, a Smithsonian employee who resented Henry’s authority and policy prohibiting private publication

⁸⁹ “Meteorology,” *Friends' Intelligencer* (Philadelphia, PA) 12, no. 40 December 22, 1855, 639, ProQuest.

⁹⁰ Joseph Henry, “Meteorology in Its Connection with Agriculture.: An Abridgement of an Article Written and Published in the Patent Office Report of 1855.,” *Southern Planter* (Richmond, VA) 19, no. 7 July 1859, 388, ProQuest.

of Smithsonian work by employees authored the first publication of the project's data. Enabled by the popularity of the project and seeking to advance his scientific reputation, and thus his career, in the wider public sphere, Lorin Blodget departed the Smithsonian and published a report based on his own tabulation and analysis of the highly valued correspondents' data he had organized as a clerk.⁹¹ Appealing to the practically minded public and the demands of agricultural interests, the report was published as a pamphlet and titled, *Climate of the Summer of 1853 and Its Relation to the Agricultural Interests of the United States*.⁹²

Despite Henry's protestations, the work won high approval in the press, although few publications seemed to realize or acknowledge the author's rift with the Institution, which praised both the Smithsonian and Blodget for their practical contribution. In its February 1854 article reviewing the work, *The Genesee Farmer* emphasized that "a moment's reflection will satisfy any well-informed mind that temperature and rain are two of the most important elements of agricultural production. The record of these furnishes data as much value to practical farmers..."⁸⁷ Reviewers of the work were not only satisfied with the knowledge it diffused but demanded such practical and valuable information be published regularly by the Smithsonian. *The Genesee Farmer* expressed "reason to hope that these researches into the climatic variations in the several States and territories in connection with the agricultural interests of the republic, may be extended in future" while the *Ohio Cultivator*, a semi-monthly agricultural periodical for Ohio farmers, declared that "this will be an interesting document for reference, especially if a similar one is issued every year"⁹³

⁹¹ Conlin, "Science under Siege," 129-130.

⁹² Lorin Blodget, *Climate of the Summer of 1853: In Its Relation to the Agricultural Interests of the United States* (Washington, D.C.: H. Polkinhorn, printer, 1853).

⁹³ "Agricultural Meteorology," *The Genesee Farmer* 15, no. 2 (February 1854); "Climate of the Summer of 1853.," *Ohio Cultivator* (Columbus, OH) 10, no. 5 March 1, 1854, 68, ProQuest.

Indeed, the combined demands and expectations from the public sphere as well the political strength of agricultural interests and the Smithsonian's obligation to farmers who contributed data to the project were highly influential in the development of the Smithsonian Meteorological Project and the Institution at large. These elements and the significant role of the extended scientific community meteorological volunteers will be further explored in the next chapter.

Among what Henry considered to be the Smithsonian's "active" operations supporting Smithson's bequest, the incorporation of the expanded scientific network of meteorological observers into Smithsonian activities most aligned with the early nineteenth-century American public sphere's expectations for scientific work. Henry's reliance on this system to conduct formal scientific research demonstrates that boundaries of professionalization were still not solidified, as he had to recognize the American public as legitimate contributors to scientific data collection and take their more practical interests into account.

Conclusion

In 1869, a man named John Kerler living on the American frontier wrote to Joseph Henry to propose his own scientific theories of electricity. "I have been *very* imprudent to bother your institution with what the Lord knows may turn out nonsense but in the first place I take you to represent a republican Institution open to all..."⁹⁴ Although his ideas were highly inaccurate, Kerler felt Henry and the Smithsonian Institution would provide guidance in his personal scientific explorations, after all, Henry represented what was understood to be a republican institution. Almost twenty years after Henry expressed frustration to Congress in his 1850

⁹⁴ John Kerler to Joseph Henry, 1869 in Molella, "At the Edge of Science," 445.

address, the American public's republican understandings of science remained embedded in how they imagined the Smithsonian Institution.

Despite the deepening establishment of professionalized science in the United States, such republican understandings continued to influence the work of the Smithsonian as its museum operations became more prominent after Henry's death in 1877. Steven Conn emphasizes the importance of this "object-based epistemology" and its democratic elements to nineteenth-century American intellectual life.⁹⁵ He finds that by the second half of the nineteenth century, objects had become just as important a source of knowledge as texts.⁹⁶ Even untrained observers could derive knowledge about a rational order to the world through observation of carefully arranged objects. Like the popular scientific publications of the early nineteenth century, museums were perceived as a public forum of knowledge diffusion. Museums were praised for their general accessibility, in which a carefully organized worldview could be visually communicated and legitimized but through objects. Within this object-based epistemology, Conn places museums, not developing universities, as central to the production of scientific knowledge by the end of the 1860s. "In a world understood through objects, in a society wrestling with questions of citizenship and national identity, many hoped museums would assume a central and public role in the intellectual, and therefore moral, life of the age."⁹⁷

Although universities, not museums, eventually became the center of specialized, legitimate scientific inquiry, questions of who is included in the processes of knowledge creation and who should have access to that knowledge continues in contemporary debates surrounding

⁹⁵ Steven Conn, *Museums and American Intellectual Life, 1876-1926* (Chicago, IL: University of Chicago Press, 2013), 24.

⁹⁶ Steven Conn, *Museums and American Intellectual Life*, 4-5.

⁹⁷ Steven Conn, *Museums and American Intellectual Life*, 16.

academic publications. In 2002, the Open Society Institute put forward the Budapest Open Access Initiative declaring:

An old tradition and a new technology have converged to make possible an unprecedented public good. The old tradition is the willingness of scientists and scholars to publish the fruits of their research in scholarly journals without payment, for the sake of inquiry and knowledge. The new technology is the internet. The public good they make possible is the world-wide electronic distribution of the peer-reviewed journal literature and completely free and unrestricted access to it by all scientists, scholars, teachers, students, and other curious minds. Removing access barriers to this literature will accelerate research, enrich education, share the learning of the rich with the poor and the poor with the rich, make this literature as useful as it can be, and lay the foundation for uniting humanity in a common intellectual conversation and quest for knowledge.⁹⁸

Since 2002, the Open Access movement has grown to combat issues of expensive journal subscription fees, inflated publication expenses, and larger barriers to publically funded knowledge. Such debates have altered scholars' individual publication practices as well as policy at the university level. Through examining the formation of the Smithsonian Institution and historical discourse surrounding the process by which intellectual fields were professionalized, academic institutions and scholars at the center of contemporary knowledge creation may better understand that this tension is not a new phenomenon brought about by the advent of the internet, but part of an inherent debate of who should have access to the "increase and diffusion of knowledge."

⁹⁸ "Budapest Open Access Initiative," Budapest Open Access Initiative, February 20, 2002, <https://www.budapestopenaccessinitiative.org/read/>.

Chapter Two

The Smithsonian Meteorological Project: Demands and Expectations of the 1850's Extended Scientific Community

At the March 22, 1856 meeting of the Smithsonian Board of Regents, Joseph Henry introduced a proposal seemingly uncharacteristic to his own convictions. According to the meeting minutes, “The Secretary presented the subject of the removal of the collection of objects of natural history, now in the Patent Office, to the Smithsonian building.”⁹⁹ In addition to models of inventions included with patent applications, the Patent Office was responsible for the care and display of the objects collected during the 1838-42 United States Exploring Expedition under the command of Charles Wilkes.¹⁰⁰ Consisting largely of ethnographic objects and natural history specimens, the extensive Wilkes collection comprised the first federally supported museum and occupied the entirety of the Patent Office building’s main gallery.¹⁰¹ Despite the annual stipend granted from Congress to maintain and house the national collection from the Exploring Expedition, “the Commissioner of Patents was growing each year more desirous of having the use of the space occupied in the Patent Office by the national collections, and appealed frequently to Congress and to the Regents of the [Smithsonian] Institution to relieve him of their care.”¹⁰²

⁹⁹ Smithsonian Institution, *Tenth Annual Report of the Board of Regents of the Smithsonian Institution Showing the Operations, Expenditures of the Institution, and Conditions of the Institution Up to January 1, 1856* (1856), 80 (hereafter cited as SI, *Tenth Annual Report*).

¹⁰⁰ For information on the U.S. Exploring Expedition, see Antony Adler, “From the Pacific to the Patent Office: The US Exploring Expedition and the origins of America’s first national museum,” *Journal of the History of Collections* 23, no. 1 (May 2011): 49; for the history of the U.S. Patent Office collections and exhibitions, see Adler, “From the Pacific to the Patent Office,” 62-63; for more on the history of the U.S. Exploring Expedition, including the locations from where and whom the Exploring Expedition appropriated objects see William Ragan Stanton, *The Great United States Exploring Expedition of 1838-1842* (Berkeley: University of California Press, 1975).

¹⁰¹ Adler, “From the Pacific to the Patent Office,” 69.

¹⁰² Goode, ed., *The Smithsonian Institution*, 316.

However, Joseph Henry's plan of organization had thus far argued against any expansion of resources for museum operations. Doing so, he believed, might divert the growth of the Institution's "active" operations of increasing knowledge through supporting abstract or theoretical research and publication. Although the act of Congress that established the Smithsonian Institution mandated that the Smithsonian regents procure a suitable building for the "[reception and arrangement], upon a liberal scale, of objects of natural history, including a geological and mineralogical cabinet..."¹⁰³ Attentive to the budgetary needs of his favored scientific programs, Henry attempted to set boundaries that would limit the Institution's museum collecting. In the second annual Smithsonian *Report of the Board of Regents* to Congress, he stated that "the portion of the income of the bequest which can be devoted to the increase and maintenance of the museum, will be too small to warrant any attempt towards an indiscriminate collection."¹⁰⁴ While Henry ultimately hoped to devote as much of Smithsonian fund as possible toward his research and publications program, he correctly identified that the expense of a broad national museum collection could not sustainably be independently supported by the Smithsonian.

Rather than "indiscriminately" collecting according to popular interest, Henry established a policy limiting collecting within three priorities. In accordance with his ideal plan of organization, Henry's primary objective was to support the Institution's publications, preferring "collections as will tend to facilitate the study of the memoirs which may be published in the [*Smithsonian Contributions to Knowledge*], and to establish their correctness..." His second priority limited collection of any art and antiquities objects to those "not generally known in this

¹⁰³ *An Act to Establish the "Smithsonian Institution," for the Increase and Diffusion of Knowledge Among Men*, Public Law 102. *U.S. Statutes at Large* 9 (1846): 104.

¹⁰⁴ Smithsonian Institution, *Report of the Board of Regents of the Smithsonian Institution Showing the operations, expenditures, and condition of the Institution* (1848), 184 (hereafter cited as SI, *Second Annual Report*).

country” with preference to illustrations and models rather than original objects. Lastly, he again sought to support original scientific works by prioritizing “a collection of instruments of physical research, which will be required both in the illustration of new physical truths, and in the scientific investigations undertaken by the Institution.” Henry further indicated that the Smithsonian should not be considered the ultimate custodians of any national collections. “It is hoped that in due time other means may be found of establishing and supporting a general collection of objects of nature and art at the seat of the general government, with funds not derived from the Smithsonian bequest.”¹⁰⁵

In fact, the Patent Office previously attempted to relinquish responsibility of the Wilkes collection to the Smithsonian only to be deterred by Henry who soundly rejected the idea of its transfer and argued that the proposal was antithetical to the intention of the Smithson bequest in the 1850 *Fourth Annual Report* to Congress.

[The Exploring Expedition] museum was collected at the expense of the government, and should be preserved as a memento of the science and energy of our navy, and as a means of illustrating and verifying the magnificent volumes which comprise the history of that expedition. If the Regents accept this museum, it must be merged in the Smithsonian collections. It could not be the intention of Congress that an institution founded by the liberality of a foreigner, and to which he has affixed his own name, should be charged with the keeping of a separate museum, the property of the United States. Besides this, the extensive museum of the Patent Office would immediately fill the space allotted for collections of this kind in the Smithsonian edifice, and in a short time another appropriation would be required for the erection of another building.¹⁰⁶

As the “objects of interest” within the Wilkes Exploring Expedition collection were already described and included in publications, Henry additionally pointed out that they would not support any new discoveries or creation of knowledge by the Smithsonian.¹⁰⁶ He sought to protect the Institution’s fund and his interpretation of the Smithson bequest from being

¹⁰⁵ Smithsonian Institution, *Report of the Board of Regents of the Smithsonian Institution Showing the operations, expenditures, and condition of the Institution* (1848), 184 (hereafter cited as SI, *Second Annual Report*).

¹⁰⁶ SI, *Fourth Annual Report*, 20.

overwhelmed by the responsibility of housing and exhibiting an immense and comprehensive national museum collection. Congress offered to grant an “annual appropriation for the support of the museum of the Exploring Expedition,” but Henry hesitated to give Congress more power over Smithsonian affairs and make the Institution “a supplicant for government patronage, and ultimately subject it to political influence and control.”¹⁰⁷ He clearly articulated the Institution’s financial inability to accept the Wilkes Exploring Expedition collection within the limited funds he allocated for museum collections and stressed his desire for the Smithsonian (and therefore its secretary) to remain as independent as possible from government organizations, funding, and restrictions. “After an experience of three years, I am fully convinced that the true policy of the Institution is to ask nothing from Congress except the safekeeping of its funds; to mingle its operations as little as possible with those of the general government, and to adhere in all cases to its own distinct organization...”¹⁰⁸ Henry was determined to limit Congress’ role to that of holding and distributing the original Smithson fund left to the United States according to the Institution’s needs. To maintain the Institution’s independence and authority in pursuing his plan of organization, he refused to accept other forms of direct institutional funding from the government which might or require greater accountability to public demands.

In the years subsequent to this initial rejection of the Wilkes collection, Henry supported alternative proposals from the Patent Office including one that proposed the government purchase the large and expensive Smithsonian building on the national mall built to fulfill Congress’ mandate for a museum, library, and art gallery. In October 1853, he wrote to

¹⁰⁷ SI, *Fourth Annual Report*, 20-21.

¹⁰⁸ SI, *Fourth Annual Report*, 20; for more on Henry’s attempts to keep the Smithsonian from being embroiled in sectional politics and the difficulties of navigating partisan Congress, see Michael Francis Conlin, “Science under Siege: Joseph Henry’s Smithsonian, 1846-1865,” (PhD diss., University of Illinois, 1999).

Alexander Dallas Bache, an esteemed physical scientist, superintendent of the U.S. Coast Guard, and fellow leader in the effort to professionalize scientific practice.¹⁰⁹

The commissioner of Patents called on me a few days ago with a proposition to purchase the smithsonian building. He informed me that the room now occupied by the museum of the exploring expedition was required for other purposes and that the government might better purchase the building of the Institution than to put up another edifice. I informed him that I did not think it proper that such a proposition should come from the Institution but that if Congress could be induced to make the purchase I thought the Regents would have no objections. ... It would be a very desirable arrangement for the Institution to get rid of the museum and library and have twelve or fifteen thousand dolls added to its income.¹¹⁰

Although he did not believe it appropriate that he propose the sale himself, Henry was highly interested in ridding the Smithsonian Institution of the building and its collections in order to pursue his own vision of an institution purely aimed at advancing abstract scientific research and publication. He expressed that if the building and its collections could be purchased by the government “we shall be able to do twice as much as we are now doing for science.”¹¹¹ Despite Henry’s enthusiasm, however, this particular suggestion from the Commissioner of Patents never came to fruition.

Following Henry’s 1856 volte-face proposal for the Board of Regents to reconsider the Patent Office collection, the Smithsonian’s eventual acceptance of the Exploring Expedition museum and its accompanying federal stipend in 1858 is frequently cited by historians of the Institution as “the determining factor that forced the Smithsonian to become a national museum with broad public access rather than a purely research-driven institution used by scholars.”¹¹² In

¹⁰⁹ For more on Alexander Dallas Bache and Joseph Henry’s combined efforts to set scientific standards and boundaries, see Kohlstedt, *The Formation of the American Scientific Community*, 157-159; or see Nathan Reingold, *Science in Nineteenth-Century America: A Documentary History* (New York: Octagon Books, 1979), 152-154.

¹¹⁰ Henry to Bache, October 17, 1853, in *The Papers of Joseph Henry*, 8, eds. Rothenberg et al., 484-485.

¹¹¹ Henry to J.H. Lefroy, November 9, 1853, in *The Papers of Joseph Henry*, 8, eds. Rothenberg et al., 489.

¹¹² Adler, “From the Pacific to the Patent Office,” 49; Marc Rothenberg also acknowledges this decision as widely considered the turning point of the Smithsonian from research institution to museum, Marc Rothenberg et al., eds., *The Papers of Joseph Henry*, 9: xxix; Nathan Reingold states that “From that date on the history of the Smithsonian

the introduction to volume nine of *The Papers of Joseph Henry*, Marc Rothenberg et al. pose the essential questions, “What made Henry change his mind? Given Henry’s earlier stance... why did Henry agree to a decision that would start the process of transforming the Smithsonian from primarily a research facility with collections to a national museum that also functioned as a research facility?”¹¹³

Rothenberg et al. outline several explanations that have been proposed by historians but also point out that no single, straightforward reasoning exists in Henry’s known papers. They dismiss several theories put forth by historians as lacking substance or not giving enough consideration to Henry’s authority. They do, however, give credence to a theory that points to the rapid expansion of the Smithsonian’s existing museum collections by the mid-1850’s as other government exploring and surveying expeditions sent newly collected specimens to the Institution.¹¹⁴ This theory posits that Henry was unsuccessful in appealing for reimbursement for the expense of these specimens’ upkeep and chose to accept the Patent Office collections and its accompanying federal appropriation before the Smithsonian fund was exhausted in supporting an inevitable “de facto national museum.”¹¹⁵

Rothenberg et al. find more definitive evidence that a significant factor in Joseph Henry’s decision to accept the Patent Office collections was the financial demands of the Smithsonian Meteorological Project. After the Institution’s publications, the project received the highest budget allocation within Henry’s “active” operations of creating knowledge.¹¹⁶ In his address

Institution can be described as frittering away of Henry’s conception and the conversion of the Institution to a museum. The remaining activities in research became largely overshadowed by the care of the contents of what was to become aptly described as the nation’s attic.” Reingold, *Science in Nineteenth-Century America*, 153.

¹¹³ Rothenberg et al., *The Papers of Joseph Henry*, 9: xxix-xxx.

¹¹⁴ Rothenberg et al., *The Papers of Joseph Henry*, 9: xxx.

¹¹⁵ Rothenberg et al., *The Papers of Joseph Henry*, 9: xxx-xxxi.

¹¹⁶ For the first allocation for meteorology in the institution’s budget see Smithsonian Institution, *Third Annual Report of the Board of Regents of the Smithsonian Institution to the Senate and House of Representatives, Showing*

within the Smithsonian Regent's *Tenth Annual Report to Congress*, Henry provided an itemized plan of operation, prioritizing a "System of extended meteorological observations for solving the problem of American storms" as the first dedicated budget item listed beneath "special objects of research, under the direction of suitable persons."¹¹⁷ In the same report, however, Henry laments that the project has not satisfactorily advanced due to funds diverted for the building and other demands on Smithsonian resources.¹¹⁸ To meet the myriad of project demands and ensure it remained a productive scientific endeavor, Henry needed to create and maintain partnerships with external organizations to attain additional funding for its support.

In *Meteorology in America, 1800-1870* historian James Rodger Fleming refers to the Smithsonian Meteorological project as "the first major scientific undertaking of the new institution."¹¹⁹ Initiated in 1848, Henry recruited volunteer correspondents from across the country and its territories to collect and calculate various data capturing daily meteorological occurrences of their locality. Volunteers then transmitted the information via mail or later by telegraph to the Institution. Fleming describes the project as "[linking] amateurs and professionals in a task that encompassed the entire United States for twenty-five years."¹²⁰ He demonstrates that meteorology remained one branch of American science in which non-professionals were "indispensable" and could make "significant contributions."¹²¹ As opposed to the professionalizing forces gaining strength in Eastern urban centers of education, "Meteorological observations, especially those from remote locations and those taken faithfully

the Operations, Expenditures, and Condition of the Institution During the Year 1848 (1849), 9 (hereafter cited as SI, *Third Annual Report*); for the continued priority of meteorology funding in the year the Patent Office Museum was accepted, see SI, *Tenth Annual Report*, 71.

¹¹⁷ SI, *Tenth Annual Report*, 9.

¹¹⁸ SI, *Tenth Annual Report*, 27.

¹¹⁹ James R. Fleming, *Meteorology in America: 1800-1870* (Baltimore, MD: The Johns Hopkins University Press, 1990), 75.

¹²⁰ Fleming, *Meteorology in America*, 86.

¹²¹ Fleming, *Meteorology in America*, 81.

over many years, were a way for non-elites to contribute to the advancement of science.

Perseverance was valued more than profound thought, cooperation more than creativity.”¹²²

Historian Daniel Goldstein utilizes the meteorological project’s correspondents list to make his own argument that the American scientific community was more expansive than suggested by the traditional profile of elite leaders like Joseph Henry and his more immediate associates. He finds that the meteorological correspondents, alongside the Smithsonian’s natural history correspondents, formed an “unusually comprehensive and representative sample of the decentralized natural science community of the United States.”¹²³ He describes their range of scientific backgrounds from consisting of some who fit Henry’s mold of professional experts to the majority who probably possessed some skill but less formal knowledge.¹²⁴ These volunteers, mostly white men, held a variety of occupations and educational backgrounds, possessed diverse interests in and objectives for conducting scientific work, and maintained varying expectations for how their relationship with the Smithsonian would benefit their own lives and meet their personal expectations of intellectual advancement.¹²⁵ From this case study, Goldstein reiterates the importance of blurring the boundaries of scientific participation, “for much of that period [the scientific population] was a loosely connected but well-integrated community, and it must be viewed as such if we are to develop a more complete understanding of the character and transformation of nineteenth-century science.”¹²⁶ By adopting this more extensive view of the

¹²² Fleming, *Meteorology in America*, 86-87.

¹²³ Goldstein, “‘Yours for Science’,” 576.

¹²⁴ Goldstein, “‘Yours for Science’,” 584-586.

¹²⁵ Goldstein, “‘Yours for Science’,” 595; Goldstein’s work largely draws on the Smithsonian correspondents network from the late 1840s-the late 1870s, including the correspondence from the early meteorological network members. He also utilizes evidence from the 1855 *Mitchell’s School Atlas* to determine the shape of the extended scientific community, Goldstein, “‘Yours for Science’,” 576-587; for the earliest published list of correspondents, see, SI, *Fourth Annual Report*, 27.

¹²⁶ Goldstein, “‘Yours for Science’,” 599.

American scientific community, less defined by educational or professional status, the influential role of extended scientific networks in the mid-nineteenth century becomes more visible.

The Smithsonian Meteorological Project demonstrated that even the “active” elements of Joseph Henry’s plan which sought to limit scientific research and its diffusion to “suitable person[s]” was not completely disconnected from the more expansive community of American science and practical research. The project was one activity in which the Institution’s research work appealed directly to the sense of republicanism instilled in the scientifically minded American public sphere. For Henry, this vast series of data would provide answers to pressing questions on laws governing weather phenomena, including the origins of storms, a topic heavily debated in the more theoretical scientific community.⁸⁵ However, accomplishing such research required more direct accountability to and reliance on a broader field of scientifically minded Americans with more practical interests, overlapping and complicating the boundaries of Henry’s vision of professional science with the public sphere’s concept of accessible and utilitarian science.

While historians such as Goldstein and Fleming have acknowledged the extended scientific community’s participation in and contribution to the scientific work of the Smithsonian, these nor other previous works have explored the full influence that the demands and expectations this wider community of scientific-minded Americans made on the Smithsonian.¹²⁷ Through examining the Smithsonian Meteorological Project correspondence, it

¹²⁷ Goldstein discusses the Smithsonian’s role in providing material and emotional support to its correspondents and points out that resources flowed both ways in this relationship, however, he does not include investigation of the collective power observer demands may have enacted on the Smithsonian in return, Goldstein, “‘Yours for Science’,” 587-591; Fleming acknowledges the vital role that members of the extended scientific community could play in meteorology in the nineteenth century, but similarly does not explore the extent of their influence on scientific institutions. Fleming, *Meteorology in America*, 81-87; Arthur P. Molella examines the overwhelming correspondence sent by the “amateur” scientific community and Henry’s approach to communicating with fringe theorists, however, he does not study any impact this correspondence had on the institution’s operations, Arthur P.

is evident that while Henry leveraged the Smithsonian's scientific reputation to build a volunteer corps of data collectors from this extended community, observers advertently and inadvertently leveraged Henry's dependence on their labor to make their own demands and place their own expectations upon the Smithsonian's resources.

Despite nascent attempts at establishing more exclusive confines of a "professional" field of science in the first half of the nineteenth century, examination of the Smithsonian Meteorological project and the relationship between its volunteer observers and the Institution calls attention to the porous boundary between "professional" and less formal modes of scientific practice. Those interested in science, but outside of professional circles still played influential roles in shaping scientific projects and institutions. While Joseph Henry sought to establish greater demarcation between professional men of science and those outside of formal practice, he still had to, as he wrote in the *Tenth Annual Report*, "[maintain] a lively sympathy" with these members of the public and meet their collective demands and expectations. Henry's meteorological project depended, after all, on volunteers' scientific labor to collect data that he understood as essential to formulating theories and principles which would advance meteorology.¹²⁸ These influential demands for Smithsonian resources and the project's overall financial needs contributed to Henry's capitulation to the Patent Office and eventual acceptance of the Exploring Expedition collection, ultimately changing the course of the fledgling institution from primarily a research institution to a national museum.

The Smithsonian Meteorological Project Network

Molella, "At the Edge of Science: Joseph Henry, 'Visionary Theorizers', and the Smithsonian Institution," *Annals of Science* 41, no. 5 (1984): pp. 445-461.

¹²⁸ SI, *Tenth Annual Report*, 24.

The establishment of the Smithsonian Meteorological project in 1848 emanated from widespread controversy in the American scientific community regarding conflicting theories on the origin of storms amongst researchers in the 1830s and 1840s. Henry and several of his scientific allies sought to make Washington the center of meteorological research and establish a North American network of volunteer observers directed from the Smithsonian.¹²⁹ During its operation from 1848-1874, allocation for the meteorological project averaged six percent of the total Smithsonian budget, starting with an initial \$1,000 allotment for the project's commencement in 1848.¹³⁰ These funds, in addition to fluctuating supplemental support from disparate federal sources over the years, enabled the program's basic activities.¹³¹ Volunteer observers were mailed twenty-four standardized blank meteorological forms each year—twelve to be filled and returned monthly to the Smithsonian and twelve to duplicate the data for their personal records. The forms required observations be taken at sunrise, 9:00 AM, 3:00 PM, and 9:00 PM (with later adjustment to 7:00 AM, 2:00 PM, and 9:00 PM to account for inconsistent sunrise time). The forms varied for three classes of observers collecting differing levels of data depending on the instruments they had available. These instruments were sometimes provided by the Smithsonian and sometimes purchased by the observer. First class observers possessed a full set of meteorological instruments— usually including a thermometer, barometer, wind vane, rain gauge, and occasionally a hygrometer— from which they recorded the most complete data. Second class observers owned fewer instruments, perhaps just a thermometer, and partially filled

¹²⁹ Alexander Dallas Bache assisted Henry in lobbying for federal funds to support meteorology and, as superintendent of the Coast Survey, lent the resources and observers of US Coast Survey to the Smithsonian Meteorological Project efforts, Fleming, *Meteorology in America*, 77-79 and 128-129; Bache and Henry were both prominent leaders of the reputed "Lazzaroni" group of scientific men who sought to build research institutions to advance a professional vision of formal theoretical science driven by qualified elites rather than the practical, less specialized popular demands of the public, Kohlstedt, *The Formation of the American Scientific Community*, 156-159.

¹³⁰ This allocation was twenty percent of the total publications budget in 1848, Fleming, *Meteorology in America*, 76.

¹³¹ Fleming, *Meteorology in America*, 117.

the blanks. Third class observers did not possess any instruments, but contributed estimated observations of wind speed and direction, cloud descriptions, and the time and duration of weather activity in their locale. In addition to forms, observers were also provided sheets of uniform instructions for observations and tables to facilitate the reduction of daily meteorological data.¹³²

The Smithsonian network of volunteer observers spanned the North American continent, although observer numbers and locations fluctuated during the project's lifespan. Generally, as James Rodger Fleming describes, "the project served to spread the aura and apparatus of science to isolated areas far from the intellectual centers of the East Coast."¹³³ The project grew from less than 200 observers in its initial years to peaking at over 500 correspondents in 1860 and 1870 (following a dramatic decline in participation during the Civil War).¹³⁴ Although mostly white men, observer class and occupation demographics varied beyond the highly visible elite men of science. According to Smithsonian assistant Edward Foreman, in 1851 the meteorological network's occupational composition largely consisted of "professors in colleges, principals or teachers of academies, farmers, physicians, members of the legal and clerical profession, and a few engaged in mechanical and mercantile pursuits."¹³⁵ Foreman described that participation in the project generally required observers be "persons engaged in occupations which admit to some extent of their being present at the place of observation at the required hours of the day all year round."¹³⁶ Observers needed to be persistent, keep regular habits, capable of handling instruments and providing accurate readings, and be reliably present at one

¹³² Fleming, *Meteorology in America*, 81-82; for more details on the meteorological project's structure, see Fleming, *Meteorology in America*, "The Structure of the Smithsonian Meteorological Project," chap. 4 in *Meteorology in America*.

¹³³ Fleming, *Meteorology in America*, 88.

¹³⁴ Fleming, *Meteorology in America*, 82.

¹³⁵ SI, *Sixth Annual Report*, 78.

¹³⁶ SI, *Sixth Annual Report*, 77.

station at each of the daily observation times.¹³⁷ Although individual volunteers' occupational requirements varied, all observers were expected to reliably and consistently collect data at the three daily observation times year-round to ensure the Smithsonian receive complete and accurate records for large-scale meteorological research.

In contrast to Henry's motivation to build an institution for the promotion of theoretical scientific work and discourage the use of Smithsonian resources for popular utilitarian purposes, many observers were motivated by the expectation that the meteorological project work would produce practical results.¹³⁸ In his 1859 letter to Henry, observer E.H. Barton of Columbia, South Carolina described his understanding of the overlapping scientific expectations of the project's stakeholders.

I am very sensible of the justice of your remark of the unsettled condition of the various principles of Meteorology... it is to be hoped that men of high attainments in science will dedicate themselves to the great work of defining + explaining the great principles... For

¹³⁷ Fleming, *Meteorology in America*, 134-135.

¹³⁸ Goldstein emphasizes that this more extensive and varied population of scientific contributors possessed equally disparate motives for and levels of commitment to participating in the Smithsonian network. Among a broad list of reasons for participation, some sought to advance a formal career in academic science through association with the Smithsonian, others sought to receive resources for professions in agriculture or medicine, several desired to engage with scientific culture for personal intellectual advancement or as a hobby, while some saw it as national or public duty to support American science, 'Goldstein, "'Yours for Science,'" 584; Observer Thornton Carpenter sought an endorsement from his connection with the Smithsonian as he sought a professional career, writing in 1853, "It is my wish to procure a permanent situation at a fair salary, as assistant in a laboratory or some similar business, where I can learn something more while employing to advantage the knowledge of natural science I now possess. If any opportunity of securing such should occur I should be grateful for an intimation to that effect and for anything you can say in my favor." Carpenter to Lorin Blodget, November 1, 1854, Camden, SC, Box 4, Records of the Smithsonian Meteorological Project, Letters received, 1848-57, Letters received, 1859-67, Records of the Weather Bureau, Record Group 27, National Archives and Records Administration at College Park, College Park, MD (hereafter cited as SMP, Letters received, National Archives); A myriad of local associations and societies sought involvement with the project for its members intellectual improvement—many soliciting instruments and publications in addition to a connection with the Smithsonian. One example included the Minnesota Scientific Institute at Minneapolis, a "scientific Society" established for "the promotion of scientific knowledge among its members, and the advancement of the general interests of science..." A member of the organization wrote in 1858 seeking both instruments and publications for the new institute. Uriah Thomas to Henry, December 31, 1858, Box 4, Series 1, Smithsonian Institution Meteorological Project Records, Record Unit 60, Smithsonian Institution Archives, Washington, DC (hereafter cited as SI MP, Smithsonian Institution Archives); John W. Rankin of Keokuk, Iowa considered participation in the meteorological project as public duty and wrote to Henry in 1849 that, "a worthy scientific enterprise demands the co-operation of good citizens." Rankin to Joseph Henry, April 20, 1849, Box 1, SMP, Letters received, National Archives.

myself I only pretend to the character of an [h]umble practical observer— my object being to obtain such results I can apply to practical purposes.¹³⁹

This varied population of contributors consisted of both those who Henry considered as conducting legitimate scientific pursuits as well as those with levels of expertise and motivations outside his boundary of true science. Goldstein asserts, however, that “these people— both those who, in Henry's opinion, made ‘positive additions to knowledge’ and those who did not— were among the Smithsonian correspondents and should be considered part of the scientific community.”¹⁴⁰ Regardless of his personal evaluation of their scientific status, Henry linked his own mission with the goals of this extended community in soliciting their assistance and correspondence in the Smithsonian Meteorological Project.

Observer Demands for Smithsonian Resources

Similar to sentiments being expressed in the press, the demand for access to scientific publications from the Smithsonian was prevalent throughout the meteorological project correspondence. S.B. Mead, a meteorological observer at Augusta, Illinois wrote twice in 1849 to request publications and express frustration with their limited distribution.

If there is left a spare copy for distribution of the Memoir on the Ancient Monuments of the Mississippi Valley, I would very much like to see it as well as any other papers or volume containing any thing of interest on Natural Sciences. ... I think Congress ought to allow persons interested in the Natural Sciences the privilege of a copy of all the Reports on such subjects at a moderate price— instead of members of Congress scattering them over the country with little or no benefit. ...¹⁴¹

In a letter two months later, Mead leveraged his contributions to the meteorological project in a further appeal for research works. “If there are some Reports made to Congress containing something interesting on Natural Science, [etc.] I would be glad to get them. I do not think it

¹³⁹ Barton to Henry, June 4, 1859, Box 7, SMP, Letters received, National Archives.

¹⁴⁰ Goldstein, “‘Yours for Science’,” 584.

¹⁴¹ Mead to Henry, July 1849, Box 1, SMP, Letters received, National Archives.

more than right that the observers should have them...”¹⁴² Despite Mead’s confusing phrasing, his emphasis on “observers” and repeated request for publications indicate his view that his participation in the project merited access to Smithsonian publications. Like many popular publications, Mead seemingly felt more comfortable situating blame with Congress in its role as distributor of the Smithsonian fund in limiting the Institution’s publications activities than with Henry’s publication distribution policies. As Congress was more accountable to constituents like Mead than the privately operated Smithsonian, he perhaps directed his argument toward prompting Congress to provide a supporting government appropriation to print and distribute additional copies of the Institution’s scientific research reports.

Henry outlined the problem of overwhelming demand for publications in his January 1851 report asserting, “We have found considerable difficulty in deciding upon the rules to be observed in the distribution of the Smithsonian publications. It must be evident from the small portion of the income which can be devoted to this object the distribution must be circumscribed.” His statement reminded audiences that the publications were not meant for the general public because “though [the publications] consist of the results of new investigations of the highest importance... they are not in all cases of such a character as to be immediately appreciated by the popular mind...” Rather, he recommended that the publications be selectively distributed without cost to “those who will make the best use of them in diffusing a knowledge of their contents.”⁵ While Henry otherwise restricted distribution of the Smithsonian’s highly sought publications to intellectual institutions as well as states and territories, he nonetheless understood the need to placate his volunteer network and thus the only individuals guaranteed

¹⁴² Mead to Foreman, November 30, 1849, Box 2, SMP, Letters received, National Archives.

editions in Henry's 1851 rules of distribution, aside from publication authors, were "all meteorological observers."¹⁴³

Making an appropriation for the observers was paramount to incentivizing many of the volunteers. For some observers, receiving highly desired publications made them feel beholden to the project and to Henry. For example, Aaron B. Hull expressed extreme gratitude to Henry when provided with research publications by the Smithsonian.

I deem it my duty to express to you sir in my humble manner the gratitude I feel towards you and the officers of the Institution... for forwarding me those valuable works. It gives me the utmost pleasure to think that you and your situation should think of me a humble individual and send me books in the possession of which I am more pleased than I should be with any other thing that could be presented me. ...¹⁴⁴

Hull explained to Henry that although he initially felt reluctant and unqualified to collect meteorological data he also felt "greatly indebted" to Henry for sending publications and expressed, "I shall always deem it a pleasure if I can at any time or in any manner aid you in your laudable endeavors..."¹⁴⁴ Project neophyte and a mechanic with a "natural fondness for Experimental science" Henry E. Hanshew of Frederick, Maryland similarly expressed his gratitude, writing to Smithsonian assistant Edward Foreman, "[I] acknowledge myself greatly indebted to you for the [1850 Report of the Board of Regents], and will gladly receive any publications on scientific subjects you may be pleased to send. I herewith send my first monthly Meteorological report hoping that it may prove acceptable to you. ..." ¹⁴⁵

Other observers viewed the publications as their rightful payment and emphasized their entitlement to research works in their correspondence. Accentuating the difficulties and labor of

¹⁴³ SI, *Fifth Annual Report*, 15.

¹⁴⁴ Hull to Henry, Georgetown, CT, November 10, 1856, Box 5, SMP, Letters received, National Archives.

¹⁴⁵ Lewis F. Steiner described Hanshew's occupation and scientific alacrity in a letter to Foreman, Frederick, MD, October, 2 1852, Box 1, SI MP, Smithsonian Institution Archives; Hanshew to Foreman, November 1, 1852, Box 1, Series 1, SI MP, Smithsonian Institution Archives.

completing daily observations was one method by which observers rationalized their entitlement to the Smithsonian reports and other publications. The monotony and effort required to take consistent readings several times daily and remain at one location year-round was inconvenient and taxing on observers' time. R.S. Bosworth of College Hill, Ohio wrote to the Smithsonian in 1854, "Please do forward all the publications to which your regulations give me any claim for I am anxious to get all the compensation I can for this drey work of recording observations."¹⁴⁶ In 1859, L.H. Streng of Grand Rapids, Michigan expressed a similar entitlement to Henry. "I should like to have something in return to show for my labor in the way of public document pertaining to scientific reports Expeditions [etc.] than I have been hitherto supplied."¹⁴⁷

William Bacon of Richmond, Massachusetts also reminded the Institution of his extensive data collection efforts in an 1852 letter sent after he failed to receive a requested report. "I have now furnished you with the meteorological record for a long time which I have endeavored at a sacrifice to make correct and believe it to be so. It is but very little I have [received] from your [institution]..." Bacon intended to persevere in recording and submitting data as he still largely approved of the project's mission and saw its "utility." He also, however, believed it was necessary to declare his right to the intellectual compensation of the Smithsonian reports. "When I sow in spring I expect to reap my bread. When I shear the fleece I expect clothing. So when the body labors I expect that which will feed and clothe the body. Is it right for the mind to be kept in toil and yet so in hunger and nakedness? If it is, indolence may as well add to the deformity and aid in the progress of intellectual death."¹⁴⁸ Likening his data collection

¹⁴⁶ Bosworth to "the assistant in charge of meteorology at the Smithsonian Institution," October 11, 1854, Box 4, SMP, Letters received, National Archives.

¹⁴⁷ Streng to Henry, March 17, 1859, Box 7, SMP, Letters received, National Archives.

¹⁴⁸ Bacon to the Smithsonian, Richmond, MA, January 3-4, 1852, Box 3, SMP, Letters received, National Archives. Foreman wrote a response to Bacon on January 9, explaining that Bacon's requestion publications had been sent several weeks ago and must have not reached Bacon because of a failure of the postal system. Foreman assured him

to other kinds of labor that also require additional knowledge— turning crops into bread and wool into clothing— Bacon conveyed that the lack of intellectual nourishment he assumed Smithsonian publications would provide could lead to distorted data.

Some correspondents made it clear even before commencing observations that their labor was contingent upon receiving publications from the Smithsonian. In 1859, A.S. Wadsworth of Henrietta, New York wrote to the Institution that he had been told meteorological observers were needed and such work would be compensated with research publications. He expressed enthusiasm for and a sense of satisfaction with this exchange stating, “I would be glad to make [observations] for you + transmit them as often as might be necessary + should feel myself well paid for the trouble by the [reception] of [works published by the Smithsonian].”¹⁴⁹ B. Winchester of Frederick City, Maryland likewise expressed the relationship as one in which his labor should be “paid” in Smithsonian publications. In fact, Winchester pronounced that he would not settle for just any cheap or brief articles in exchange for his meteorological labors since “it will require considerable time and a good deal of confinement and exact observation in order to make proper reports.” He clarified that if Henry wanted his assistance, “I do not think the pamphlets would be a compensation, but if a copy of all the publications is to be received, in closing the contributions, it will afford me pleasure to prepare myself to make reliable reports.”¹⁵⁰

that replacement copies would be mailed immediately, Foreman to Bacon, January 9, 1852, Box 1, Records of the Smithsonian Meteorological Project, Letters sent, 1850-53, Records of the Weather Bureau, Record Group 27, National Archives and Records Administration at College Park, College Park, MD (hereafter cited as SMP, Letters sent, National Archives).

¹⁴⁹ Wadsworth to the Smithsonian Institution, January 18, 1859, Box 4, Series 1, SI MP, Smithsonian Institution Archives.

¹⁵⁰ Winchester to Henry, August 30, 1856, Box 5, SMP, Letters received, National Archives.

In addition to the regular demands of the project, a myriad of other issues could also increase the difficulty of producing regular, accurate data. Many observers experienced difficulties such as broken instruments or property loss, sickness or death in the family, disrupted Smithsonian communications, unreliable mail systems that prevented the timely delivery of blank forms and resources, the discouragement of failed scientific endeavors, or the demands of paid work and financial hardships that limited observer time, in addition to a variety of other issues.¹⁵¹ C. Chase of Chatham, Ohio wrote to inform Henry in 1850 that he carried out his daily observations for over a year on behalf of the Smithsonian despite difficulties he encountered, citing that “severe + afflicting [sickness], and even death has recently visited my family. ...” In exchange for his exertions, Chase communicated that he expected compensation through Smithsonian publications. “[I] shall be happy to receive the remuneration, by way of ‘publications of the Institution’... If I may be able to [assist] in adding anything to the stock of knowledge, I shall feel myself well rewarded, to be able to drink at its fountain, in return.”¹⁵²

Although their work was volunteered to the cause of science, these observers demanded

¹⁵¹ Records of meteorological volunteer troubles and adversity are observable throughout the Smithsonian meteorological correspondence, see SMP, Letters received, National Archives or Series 1, SI MP, Smithsonian Institution Archives; several examples include: An 1858 letter from Edward Fish of Burlingame, KS reported “my observations were interrupted by the accidental breaking of my thermometer, and I was so long unable to replace it,” Fish to Smithsonian Institution, 1858, Box 3, Series 1, SI MP, Smithsonian Institution Archives; William N. Byers of Omaha, NE wrote of gaps in his data records for the beginning of 1857 because “I did not receive my instructions and blanks until May,” Byers to Henry, April 5, 1858, Box 3, Series 1, SI MP, Smithsonian Institution Archives; An 1851 letter from L.F. Munger stating that “I regret [that my journal is] not more full. I have had but little rest for mind or body since last summer, my family have been very sick most of the time since then, my youngest child probably will not live another week, and I have but little time to attend to scientific matters,” Munger to Smithsonian Institution, December 27, 1851, Albion, NY, Box 3, SMP, Letters received, National Archives; D.H. Ellis wrote to Henry in 1857, “[I] concluded to continue one month longer and then stop regular observations, unless you concluded to render me some aid, as I cannot get a substitute even for a day without pay period and it interferes with my other business in a measure, and I have a young family to provide for that needs all my exertions to provide for them and am poor so that I need compensation for my services, were it otherwise I would willingly attend to it for the gratification and information that I could gain by it. I had ought to have been away two weeks in June on business but have put it off and will for the present, but I hope to hear from you soon that I may shape my course accordingly,” Ellis to Henry, July 1, 1857, “Crack-Whip,” VA, Box 6, SMP, Letters received, National Archives; in 1856, C. Barnes of New Albany, Indiana uniquely expressed that his observation’s work was curtailed by the dual need to spend his summer “hunting for an office... and hunting for a wife,” but only finding success in the latter, Barnes to Henry, November 1856, Box 5, SMP, Letters received, National Archives.

¹⁵² Chase to Henry, 1850, Box 2, SMP, Letters received, National Archives.

intellectual compensation for their efforts in the form of the Smithsonian's highly sought publications. They did not think of their relationship with the Institution as one-way, but an exchange of materials to advance the individual and institutional efforts of American scientific interests.

Observer expectations of scientific publications in exchange for observations were not just empty demands that could be ignored. Project contributors who felt unsupported, unappreciated, or unjustly used often ceased gathering meteorological data. Some quietly left the project, while others wrote to the Smithsonian to explain their discouragement when publications were not readily provided. Farmer William W. Austin of Richmond, Indiana wrote to the Smithsonian in 1856 to explain his leave from the project.

I took great pleasure in the study... but confess that I quit because I thought I had not justice done me. Some one at your place used to furnish me regularly with your annual report... but of a sudden they ceased coming... as I thought the treatment unfair, I did not work for pay, but such returns were a great incentive to action, but when no notice was taken of my remark on such treatment, I quit.¹⁵³

Though Austin viewed his voluntary collection of data as a contribution and did not expect monetary payment, he clearly expected to receive something in return for his time. In 1859, H.M. Sheerar, a "surgeon and mechanical dentist" in Wellsville, New York, likewise expected that his contribution merited something in return. Like Austin, Sheerar felt his work was unappreciated and warned Henry that he would discontinue his observations if he was not immediately sent the publications he demanded. "I concluded my observations were valueless because I did not get a copy of the Patent Office Report 1857 [sic]. If I receive a copy I will commence my observations again & endeavor to keep them up."¹⁵⁴ Henry depended on the return of data from volunteers, therefore, dedicating a portion of the Smithsonian's limited publications budget to fulfilling the

¹⁵³ Austin to the Smithsonian Institution, 1856, Box 5, SMP, Letters received, National Archives.

¹⁵⁴ Sheerar to Henry, March 19, 1859, Box 7, SMP, Letters received, National Archives.

imagined transactional relationship of the wider scientific community was essential to the meteorological project's success.

In arguing for their own entitlement to the Smithsonian's publications, several meteorological correspondents used rhetoric like that of the popular press to express their republican expectation that the Institution's intellectual efforts would directly serve the wider American population. Preceding Joseph Henry's 1851 publications allocation for all meteorological correspondents, observer John Newton of Knox Hill, Florida submitted his second monthly meteorological report to the project in 1850 and wrote to Henry that he was "quite anxious to obtain the Reports of the Institution." He provided several suggestions for how the Smithsonian Institution might meet the wider public demand for its publications, prompting, "Would it not contribute to the diffusion of knowledge if interested persons keep them for sale in every district? Many persons would be glad to buy them if they were in reach. Or if a yearly tax were laid upon all who would be willing to pay it, and those persons receive the reports, the funds of the institution would be reimbursed and knowledge would be diffused."¹⁵⁵ While understanding and accommodating for financial limitations, Newton clearly believed that wider distribution of the publications was in the interest of "many persons" and important to the Institution's mission of diffusing knowledge beyond Henry's more restrictive view of the Institution's direct audience.

J.D. Parker of Steuben, Maine wrote to Henry in 1849 and emphasized his belief that "The Subject of [meteorology] is of much importance to the Country, & to the World." However, while he supported the Smithsonian's efforts to compile data and conduct investigations into the laws of meteorology he expressed dissatisfaction with the circumstances which limited access to

¹⁵⁵ Newton to Henry, February 5, 1850, Box 2, SMP, Letters received, National Archives.

the Institution's research thus far. "The Smithsonian Institute must prove of great value to the Public if the Smithsonian Contributions are continued to be published, as it has been, that such works have by their great [loss], been locked up from all but the wealthy..."¹⁵⁶ Perhaps unaware of Henry's recent special allocation for meteorological volunteers, observer William Bacon criticized the restrictive distribution of publications in his 1852 letter demanding intellectual compensation for his labor.

I believe you furnish to Colleges and some other institutions full copies of your publications. I don't know why so wide a distinction between corporate [institutions] whose officers are salaried and which are furnished from time to time with public funds and an individual who is plodding on, depending upon his personal resources and gaining his bread by the daily labor of his hands. I do not say, however, but it is right for you to do so, but I do say: for the love of truth and Justice do not call that an institution for the benefit of mankind, which dispenses its favor in so partial a manner.¹⁵⁷

Observer L.H. Morgan advised Henry in 1857 that wider distribution of the Smithsonian reports would not only be of "great use to the country" but also benefit the Smithsonian by countering any previous public dissatisfaction and "[introduce] the Institution to the popular favor." Morgan posited if the Institution fed the "appetite" of public demand, Congress would then be forced to fund additional publications to "gratify their constituents" and "if managed well... you would have an extra volume each year to distribute without taxing the funds of the Institution for its publication."¹⁵⁸ While many observers felt entitled to receive Smithsonian publications in return for their contribution to the meteorological project, others shared the more extensive republican expectations being expressed in the popular press that the Institution's research should more directly serve the intellectual demands of the American public.

¹⁵⁶ Parker to Henry, April 16, 1849, Box 1, SMP, Letters received, National Archives.

¹⁵⁷ Bacon to the Smithsonian, Richmond, MA, January 3-4, 1852, Box 3, SMP, Letters received, National Archives.

¹⁵⁸ Morgan to Henry, Rochester, NY, January 1, 1857, Box 5, SMP, Letters received, National Archives.

In addition to scientific publications, another resource frequently sought by observers were instruments for meteorological observations such as thermometers, barometers, hydrometers, psychrometers, and rain gauges. While instruments were not necessary for participation in the meteorological project— an entire class of observers in the project were designated as those without instruments— many volunteers desired to extend their contributions and expand their own scientific pursuits by joining the project classes with instruments. Some observers were able to purchase full or partial sets of instruments themselves. However, many others requested that the Smithsonian furnish them with additional scientific apparatus. Some, like Walter Hay, M.D. of Palatka, Florida, connected their request for instruments to other scientific fields, such as the management of diseases. In his 1855 request for additional instruments to collect meteorological data he noted the “special reference” such devices might provide “to the ascertaining the influence of climate and atmospheric agencies in causing the diseases incident to this locality.”¹⁵⁹ As he was unable to procure them himself, he requested the Smithsonian loan him necessary instruments, and in return, he would provide the Institution’s meteorological project with a copy of his data. Others, like Reverend L. Atkins of Madison, Ohio simply described the inadequacy of homemade tools. In 1858, Atkins, wrote to request a rain gauge after attempting to use a homemade substitute to collect his data. “Tried a tin cup for one month but it cost me too much trouble. Will the Department send me a gage [sic]? The reason I do not keep a record more fully is want of instruments; and inability to procure them is why I have them not. The fact is I am too poor to try.”¹⁶⁰

Henry attempted to supply observers with instruments to expand their data collection within the project’s limited budget. To be sure, despite the reliance on an expansive network of

¹⁵⁹ Hay to Henry, July 14, 1855, Box 2, Series 1, SI MP, Smithsonian Institution Archives.

¹⁶⁰ Atkins to Joseph Holt, July 1858, Box 4, Series 1, SI MP, Smithsonian Institution Archives.

volunteers, Henry, at times, displayed the sense that the Smithsonian judged the “capabilities” of its volunteers. In 1849, the Smithsonian issued a circular which announced the Institution would provide instruments to “capable” volunteers at strategic locations. Demand for instruments rapidly surpassed the project’s limited funding, however, and the policy was modified to defray half of the cost of instruments if individual observers could pay the other half.¹⁶¹ Henry summarized impediments to the project’s attempted distribution of instruments in his 1852 report. “The demand was so great, and the loss by breakage in transmitting the instrument so frequent, that the appropriations were soon exhausted, and until we can afford to devote a large sum to the object, and employ a special agent to transport the articles to their destination, it will be inadvisable to attempt anything more in this way.”¹⁶² Edward Foreman, the Smithsonian assistant charged with managing and responding to meteorological correspondence routinely repeated tactful and apologetic rejections of the overwhelming application for instruments in his 1850-1853 replies. “Prof Henry directs me to inform you (which he does with regret) that the fund applicable to the purchase of meteorological instruments is not only exhausted but overdrawn, which renders it impossible to aid any of the numerous applicants for aid of this kind.”¹⁶³ Although Henry did not personally read all pieces of correspondence, Foreman assured observers of the secretary’s concern for their inquiries and that the denial of instruments was not based on any personal disqualification, but a financial limitation that resulted in numerous other applicants also being turned down. Such reassurances were necessary to avoid displeasure amongst the observers, but Foreman likely used real financial limitations as reasoning behind the

¹⁶¹ Fleming, *Meteorology in America*, 83.

¹⁶² SI, *Sixth Annual Report*, 21.

¹⁶³ Foreman to Dr. B.F. Mills, March 22, 1852, Box 1, SMP, Letters sent, National Archives; for additional responses from Foreman to requests for instruments, see Box 1, SMP, Letters sent, National Archives.

denial of resources to those observers judged less “capable” than those whose applications were initially approved.

In the letters sent accompanying their regular data returns, meteorological observers ubiquitously demanded the attention and resources of the Smithsonian Institution through their expectation of a timely and complete response to any project-related or personal inquiries. In addition to carrying out regular project tasks such as answering questions on procedure or routinely sending blank project forms for recording data, observer correspondence directed institution time and resources to assembling and distributing requested publications, addressing any observer grievances or issues, and engaging with the myriad of scientific inquiries and proposals, whether practical or theoretical, accurate or absurd. According to Daniel Goldstein, “the Smithsonian also provided emotional encouragement that was just as important to members of the scientific community as the support of their research... Personal attention from the secretary or assistant secretary of the Smithsonian (or even an impersonal endorsement of their efforts) restored the enthusiasm of countless isolated naturalists and local societies...”¹⁶⁴ The responses to such inquiries were personally, intellectually, or professionally important to observers seeking to further their education, pursue their own scientific projects, or bolster their association with the Institution.

In fact, allocating part of the Institution’s budget for a position dedicated to the correspondence was necessary as Henry stated in his 1850 report that “[the meteorological correspondence] is found not only to involve considerable labor in the way of receiving the regular returns and sending the required blanks and directions, but also in relation to the discussion of questions on almost every branch of science propounded to us by the

¹⁶⁴ Goldstein, “‘Yours for Science’,” 589.

meteorological observers...” As a result, Edward Foreman was hired to manage the project’s overwhelming correspondence in 1849. Despite the volunteers’ correspondence not always meeting Henry’s standard of scientific inquiry for which he dedicated Smithsonian resources, he asserted in his 1850 report that “it is our duty in all cases, to treat [the meteorological correspondence] with respect, and to answer to the best of our knowledge.”¹⁶⁵ Foreman explained this policy and its reasoning further in his 1851 report on the project. “[The correspondence] is always cheerfully performed, inasmuch as it may be regarded as a part of the remuneration which the observer has a right to expect in return for the time and labor expended by him on the observations. It is believed also that the prompt attention given to this part of the plan has tended greatly to keep the core of observers together.”¹³⁶

Foreman and Henry’s recognition of the necessity of providing timely support and encouragement to their volunteers was proved when inefficiencies in the postal system or other disorganization slowed communications and made observers feel neglected and undervalued. Following a lapse in communication in 1858, Benjamin Whitaker of Warsaw, Illinois confronted Henry in a letter complaining, “I wrote to you on the subject [of receiving instruments] but got no answer. I wrote the second and third time and no answer— feeling slighted I discontinued my monthly reports. ... the time and attendance bestowed upon [sic] the Observations ought to Entitle the observer to some Confidence [from the Institution] If nothing more.”¹⁶⁶ In order to “keep the core of observers together” dedicating time and support to observers through correspondence was essential.¹³⁶

Many observers used their connection with the Smithsonian to engage with the Institution’s research and to develop their own theories and scientific careers. Professor N.B.

¹⁶⁵ SI, *Fifth Annual Report*, 19.

¹⁶⁶ Whitaker to Henry, April 2, 1858, Box 3, Series 1, SI MP, Smithsonian Institution Archives.

Webster of the “Virginia Collegiate Institute” in Portsmouth, Virginia solicited feedback from Henry on his use of meteorological data to create diagrams and tables which might elucidate new scientific laws and principles. “If in your opinion [my views] are in accordance with scientific principles, I shall be very glad to hear from you, as I shall be encouraged to prepare them more carefully for a paper on the subject. If I am in error in any of my deductions from facts, I shall be doubly thankful for a suggestion from you relative thereto.” He highly valued not only Henry’s opinion, but the connection to the field of science his correspondence with the Smithsonian provided as, “I am almost isolated from scientific association here, and deprived of many works of reference that I would like.”¹⁶⁷ In 1858, observer J. Grinnell of Nolin, Kentucky wrote to share his mathematical findings explaining, “I have a method of exacting the cube root which has never been published, and which is much easier than any method I ever saw in print. ... If you wish to see it, I will send you a few examples and an explanation of the method. ...”¹⁶⁸ Grinnell then earnestly acknowledged that it was his correspondence with the Smithsonian which inspired and sustained his own scientific interests.

The fact is my correspondence with you has given a new impulse to my mind in regard to scientific knowledge; it has set my mind to work as it were anew. The desire to acquire knowledge, and the delight of scientific studies may be kept down by circumstances and nearly choked up as it were; but like the smouldering [sic] fire of a volcano it only waits for an opportunity to burst through all obstacles and to show its power over all that had so long held it in a state of inactivity.¹⁶⁸

Like Webster and Grinnell, George E. Brackett of Belfast, Maine expressed the value of connection with the intellectual resources of the Smithsonian. For Brackett, corresponding with the Smithsonian enabled him to pursue questions of science and intellectual improvement, despite an admittedly humble educational background.

¹⁶⁷ Webster to Henry, July 17, 1856, Box 5, SMP, Letters received, National Archives.

¹⁶⁸ Grinnell to the Smithsonian Institution, April 18, 1858, Box 3, Series 1, SI MP, Smithsonian Institution Archives.

I am aware of your position in reference to the solution of questions which may have no foundation in fact, and no existence except in the mind of the propounder [sic]. Undoubtedly my questions appeared simple and perhaps, contradictory in themselves, but by me they were not so easily understood. A poor farmer's boy, knowing nothing of the world— by observation beyond his own village— with no facilities for acquiring an education beyond those afforded by the country district school— whose library consists of a few reports periodicals and the simplest elementary works, may be overlooked in his blunderings upon promising not to be guilty of a repetition.¹⁶⁹

While some observers brought theoretical questions and responses to the Smithsonian published research they received, others saw the Smithsonian as an aid in matters of practical science. In May 1852, observer Dr. A. Grinnan of Madison, Virginia sent “a few stems of injured wheat” containing a specimen of a fly which had been attacking the season’s crop. He sought help in identifying the fly as “it is feared that many thousand bushels of wheat will be destroyed by it during the ensuing season.”¹⁷⁰ Ten days after Grinnan wrote his letter, Foreman responded, “[the insect] was to day [sic] examined under a microscope... that which infests your plants is not a fly... but is allied to the Wasps and Bees and is included in the order Hymenoptera. ... The matter is yet under investigation and in the event of further development I will communicate them to you. ...”¹⁷¹ Obligation to the meteorological observers in exchange for the scientific data they provided required that the Smithsonian devote its attention and resources to the practical goals and concerns of the extended scientific community. Ironically, about a month after Foreman aided Grinnan in his effort to identify the insect destroying his community’s crops Henry gave his dramatic address to the 1852 National Agricultural Convention declaring that he would rather see the Smithsonian blown up than turned into an agricultural society. While Henry possessed strong feelings of separating agricultural interests from the research work of the Smithsonian Institutions, he simultaneously utilized and relied on oppositely minded members of

¹⁶⁹ Brackett to Henry, January 23, 1861, Box 6, Series 1, SI MP, Smithsonian Institution Archives.

¹⁷⁰ Grinnan to Foreman, May 10, 1852, Box 1, Series 1, SI MP, Smithsonian Institution Archives.

¹⁷¹ Foreman to Grinnan, May 20, 1852, Box 1, SMP, Letters sent, National Archives.

the extended scientific community to collect data and further meteorological science—an enterprise which required intertwining his own goals with practical and agricultural interests in science.

The Blodget Affair and Pressure to Publish Data

In addition to receiving material resources and personal support, a critical demand and expectation expressed by observers was that the data they worked to gather daily, organize, and regularly submit be published and made useful to both their personal projects and scientific enterprise at large. Observers expressed such motivation to see their work advance the science of meteorology throughout their correspondence. In 1853, Daniel Hunt of Pomfret, Connecticut wrote to Foreman and explained that his great interest in meteorology was not necessarily for his own gratification, but also a desire to see its scientific advancement beyond current limited knowledge. “I am glad to see the effort which the Smithsonian Institution is making to collect & arrange facts from all parts of the American continent, which in a course of years will furnish data to that can be relied upon— As yet there are no series of observations of sufficient extent, accuracy + duration to warrant very definite conclusions or reveal fixed laws.”¹⁷² David L. Ruffner of Kanawha, Virginia similarly expressed being motivated by the ideals of the Smithsonian’s mission, writing to Henry in 1856,

I honor you for the high, firm + noble stand you have taken in reference to the carrying out of [Smithson’s] will, intended, as it was, to be the means, not of collecting old stores of science, but to aid in developing new ideas, for the benefit of all mankind, whom he claimed as brothers. ... I am acinous [sic] to increase my knowledge, and to make some endeavors to aid science in my humble way, as best I can.¹⁷³

¹⁷² Hunt to Foreman, January 31, 1853, Box 1, Series 1, SI MP, Smithsonian Institution Archives.

¹⁷³ Ruffner to Henry, December 20, 1856, Box 5, SMP, Letters received, National Archives.

After several years of the Smithsonian Meteorological Project's operation with no institutional publication of observer data or evident progress toward preparing the data for publication, observers began to express dissatisfaction with— what they assumed— was the Institution's neglect of their work and failure to fulfill its part of the project's responsibilities. Observer John F. Jenkins of White Plains, New York wrote to the Smithsonian in 1855, "It is to be regretted that the observations... cannot be published + distributed among the observers. Such publication would enable them to obtain some benefit from their labors by comparison with those of others, and would stimulate + encourage many who are becoming lukewarm, or declining to observe at all."¹⁷⁴ Farmer William W. Austin wrote to fellow Indiana observer John Chappelsmith in 1854 to suggest the two take matters into their own hands and send each other their own data for local comparison. While not as comprehensive as the Smithsonian's total received data, they would at least have a larger dataset from which to work. Austin expressed his disappointment with the lack of results from the Institution writing, "I have often thought they might give us a condensed statement at the end of every 3 mos [sic], or so. ... where observers are placed like you + I are, the comparison of storms in our direction would lead to a more careful study of them at the time, and make our journals of more interest to ourselves."¹⁷⁵ University of Michigan Professor A. Winchell explicitly described his displeasure with the lack of resulting data publication in an 1856 letter.

For years I observed for the Smithsonian Institution furnishing myself with instruments [and] reporting monthly under the vain hope of seeing eventually some abstract of my observations in a published form in connexion [sic] with the observations of other observers. A copy of all the observations reported annually to the Smithsonian Institution would have been a sufficient recompense and inducement. Instead of this I, in common I suppose with other observers received only the promises of the Institution and an occasional cheap pamphlet. At the close of 1855 my fine instruments passed out of my

¹⁷⁴ Jenkins to William J. Rhees, February 17, 1855, Box 2, Series 1, SI MP, Smithsonian Institution Archives.

¹⁷⁵ Austin to Chappelsmith, May 7, 1854, Box 4, SMP, Letters received, National Archives.

hands and being thoroughly disgusted with the [dilatoriness] of the SI I firmly resolved to report no more observations.¹⁷⁶

Rothenberg et al. argue in their ninth volume of Henry's collected correspondence that in response to these increased project tensions, "Henry needed to justify the Smithsonian's expenditures on the meteorological project and to provide some sort of tangible evidence to the volunteer observers that their efforts had not been wasted."¹⁷⁷ As years of unpaid work to record and submit daily observations passed without the anticipated reward of seeing such labor result in published data distributed and analyzed to advance scientific theory, observers like Jenkins, Winchell, and Austin were becoming disenchanted with the project.

Henry had not understood the breadth and scale of labor and resources required to organize such a data-collection program when he initiated the meteorological project in 1848. He admitted as much in his reply to Winchell's 1856 letter, writing, "When the plan of soliciting observations from observers was commenced, little idea was entertained of the labor and expense which would attend the enterprise..." Not only was the correspondence a full-time job, but the Smithsonian would need additional labor to reduce and compile the monthly returns into publishable data and then attain funding for its publication. Henry felt obligated to personally reassure and explain the Smithsonian's position to Winchell, "I now embrace the first opportunity to express my regret that you have considered yourself improperly used by the Institution. The copies of the observations you have forwarded us have been carefully preserved, and will be used in discussing the meteorology of the United States." Henry defended the Institution by pointing to its insufficient budget, explaining that because there was a "limited portion of the income of the Smithsonian fund which could be appropriated to meteorology, after

¹⁷⁶ Winchell to Charles Mason, Ann Arbor MI, September 23, 1856, Box 5, SMP, Letters received, National Archives.

¹⁷⁷ Rothenberg et al., *The Papers of Joseph Henry*, 9: xix-xx.

the annual payments of the building, support of the library, museum, and a system of lectures, together with the publication of the Smithsonian contributions, it was found impossible, immediately to reduce and publish the materials which had accumulated.”¹⁷⁸

Despite funding challenges, by 1851 Henry had realized that reducing the backlog of observer data would require additional labor. That year, he hired Lorin Blodget as a temporary clerk at the behest of Blodget’s Congressman. Blodget previously participated in the project for two years as a volunteer observer in Sugar Grove, Pennsylvania— one of the few observers provided instruments by the Institution. As a Smithsonian clerk, he was paid \$1.50 per day to reduce observer data to seasonal and yearly averages. In 1853, Blodget took over the management of the meteorological correspondence from Edward Foreman.¹⁷⁹

However, Blodget’s career ambitions soon incited conflict between himself and Henry as he sought a greater role in the field of meteorological science. Blodget suddenly left the Smithsonian after eight months over a payment dispute, applied for Congressional aid to establish his own meteorological program, and presented three papers on meteorology to the American Association of the Advancement of Science that utilized the meteorological project’s data without crediting the Smithsonian or its observers. Henry’s influence hindered Blodget’s access to the Congressional funding and he repudiated Blodget’s claims to sole credit for his work at the AAAS meeting. Henry strongly opposed use of the Smithsonian data by the Institution’s employees before its publication made it accessible to the rest of the scientific

¹⁷⁸ Henry to Winchell, November 1, 1856, in *The Papers of Joseph Henry*, 9, eds. Rothenberg et al., 405.

¹⁷⁹ Fleming, *Meteorology in America*, 110-111; for Blodget taking over from Foreman, see note five in Rothenberg et al., *The Papers of Joseph Henry*, 9: 172.

community. However, he diplomatically subdued the reprimands he made in front of the AAAS by offering Blodget his old position as clerk.¹⁸⁰

Historian James Rodger Fleming describes Blodget's second term as a temporary clerk as "short and confrontational."¹⁸¹ Blodget characterized his position as head of the entire Smithsonian meteorological department, while Henry viewed him as a "glorified clerk" tasked with reducing the observer data.⁷⁶ In May 1854, Blodget chose to join forces with Charles Jewett and Rufus Choate during the library controversy, seeing an opportunity to force Henry from the Institution and assume legitimate control of the meteorological project. While Henry proved victorious in the library controversy when Congress confirmed his authority to dismiss Jewett as well as Blodget and supported his decision to diminish the Smithsonian library program, Blodget's insurgency continued to damage the meteorological program. Blodget widely declared the Smithsonian's inability to fund the project and accused Henry of neglecting the program work. According to Rothenberg et al. "perhaps more seriously, from Henry's perspective, Blodget had claimed publicly that he had not only performed the administrative duties of the meteorological program, but that he had provided the intellectual framework as well."¹⁸²

Following his termination and seeking to advance his scientific career in the wider public sphere, Blodget published a report based on his own tabulation and analysis of the highly valued correspondents' data he had organized as a clerk.⁹¹ Appealing to the practically minded public and the demands of agricultural interests, the report was published in both the Patent Office Report for 1853 and as a pamphlet titled, *Climate of the Summer of 1853 and Its Relation to the*

¹⁸⁰ Fleming, *Meteorology in America*, 111-112.

¹⁸¹ Fleming, *Meteorology in America*, 112.

¹⁸² Rothenberg et al., *The Papers of Joseph Henry*, 9: xxvi.

Agricultural Interests of the United States.¹⁸³ He additionally compiled an essay based on the reduced data for the 1855 *Army Meteorological Register*, subsequently resulting in a rift between Henry and the Surgeon General who provided the Smithsonian meteorological project support in the past.¹⁸⁴ Blodget's insubordination and the attention his publications placed on the Smithsonian's own lack of published data called Henry's national meteorological authority into question and made the Smithsonian Meteorological Project vulnerable to ambitious scientists like Blodget who sought to lead their own competing national weather networks.¹⁸⁵

Despite Henry's protestations that Blodget had violated the Smithsonian institutional meteorological efforts by claiming the work as his own, the publications won high approval in the press, with the involved government agencies, as well as among many observers. Observers expressed gratification in seeing their contributions officially published and made useful to both them and wider scientific enterprise, although they may not have been aware of Blodget's dramatic break with the Institution. William W. Austin wrote to Lorin Blodget in 1854, "I am glad you publish such reports as the two you have on ~~Climate~~ the summer of '53; such works are not only useful, but shows us that our observations are of immediate use."¹⁸⁶ Daniel Hunt of Pomfret, Connecticut felt similarly pleased with Blodget's rogue report, writing to the Smithsonian on the subject in 1854. "I am much obliged for your pamphlets on the 'climate

¹⁸³ United States Patent Office. *Report of the Commissioner of Patents for the Year 1853. Agriculture*. S. Ex. Doc. No. 27. 33rd Cong., 1st sess. (Washington, DC: Beverley Tucker, Senate Printer, 1853), 328 ; Lorin Blodget, *Climate of the Summer of 1853: In Its Relation to the Agricultural Interests of the United States* (Washington, DC: H. Polkinhorn, printer, 1853).

¹⁸⁴ Fleming quotes Surgeon General Thomas Lawson writing to Jefferson Davis in 1856 regarding his decision to publish Blodget's essay "because, in his words '[I was] tired of waiting for the long expected 'Contribution' to Meteorology from the Smithsonian,'" Fleming, *Meteorology in America*, 114.

¹⁸⁵ In addition to Blodget's attempts to steer potential federal funding toward an alternative meteorological system of observations, Fleming also discusses the ultimately unsuccessful encroachment on the Smithsonian system by the ambitions of Naval superintendent Matthew Fontaine Maury, Fleming, *Meteorology in America*, 106-109.

¹⁸⁶ Austin to Blodget, February 23, 1854, Box 4, SMP, Letters received, National Archives.

condition of our country.’ They show the value of your system of observations + give hope of grand results to the science of Meteorology, if they can be continued for a course of years.”¹⁸⁷

Whether due to lapsed communications, Blodget poaching observers for his own work, or overall disillusionment with Smithsonian progress, observer participation in the meteorological project plunged in 1854 and 1855. James Rodger Fleming graphs the number of Smithsonian meteorological observers participating each year from 1849-1874. The graph shows a loss of nearly 100 observers from 1853-1855 which Fleming directly attributes to the “Blodget Affair.”¹³⁴ Following Blodget’s insubordination, Henry personally took oversight of meteorological communications. He explained Blodget’s duplicitous role to several observers in an attempt to maintain their loyalty under his direction. In response to an 1854 letter regarding a meteor from observer Increase Allen Lapham to Blodget via the Smithsonian, Henry requested that Lapham address all future communications directly to the secretary. He clarified that:

Mr. Blodget has no permanent connection with this Institution, but has been employed by me to compare and reduce the meteorological observations. I regret to say, though the observations have cost the Institution at least \$10,000—he considers the results that have been deduced from them as belonging to himself, & that letters similar to the one you have written, as communications to him individually. ¹⁸⁸

Henry explained that he would give due credit and pay to Blodget’s actual work in reducing some of the data, “but since Smithson left his own name to the Institution & intended it as a monument to himself, it is necessary that whatever is done in the way of promoting science by the expenditure of his money, should be accredited to his Institution. The secretary alone is responsible for all the operations of the institution.”¹⁸⁸ While Blodget saw the data reduction and interpretation work he conducted as a clerk as his own, Henry objected to use of the

¹⁸⁷ Hunt to the Smithsonian Institution, February 3, 1854, Box 4, SMP, Letters received, National Archives.

¹⁸⁸ Henry to Lapham, May 29, 1854, in *The Papers of Joseph Henry*, 9, eds. Rothenberg et al., 89.

meteorological project data before its general availability to “suitable persons” of the scientific community under his own regulation as the Smithsonian’s authority figure.

Henry further sought to scientifically discredit Blodget during the 1855 Congressional committee hearings investigating Blodget, Jewett, and Choate’s claims against Henry’s authority. The secretary brought Smithsonian consultant, James H. Coffin, an established meteorological investigator, to publicly testify against both Blodget’s work and his claims to significant independent meteorological contribution. Coffin informed the committee that Blodget’s work contained “numerous errors in a small space,” either made by Blodget or negligently copied from others by him.¹⁸⁹ He further testified that within Blodget’s methodology, “I have not discovered anything new or original... for the purposes of discussion and research, his method has often been adopted before; but, for the purpose of a published list of observations, I never saw it before, nor do I think it a proper one. ... Except in his discussions and deductions, I do not discover anything but that which a clerk might do.”¹⁹⁰ According to Coffin (and perhaps Henry through Coffin’s testimony), Blodget did not qualify among “suitable persons” for producing research from Smithsonian resources, as Coffin determined Blodget’s agricultural interpretation of the meteorological data neither producing original research nor novel methodology for science. While Henry may have initially relied on him for the data collection and reduction work for the meteorological project and many project observers appreciated his interpretation and publication of data, Blodget’s overall scientific work was dismissed as nothing “but that which a clerk might do.”

The 1855 Patent Office Arrangement

¹⁸⁹ House of Representatives, Select Comm. on the Management of the Smithsonian Institution, *Journal of the Committee*, H.R. Rep. No. 141, 33rd Cong., 2nd sess., at 91 (1854-44).

¹⁹⁰ House of Representatives, Select Comm. on the Management of the Smithsonian Institution, *Journal of the Committee*, H.R. Rep. No. 141, 33rd Cong., 2nd sess., at 92 (1854-44).

While attempting to manage the immediate challenges to the Smithsonian program, Henry still desperately needed the meteorological data reduced and published to prove the project's ability to produce tangible, credible results. By late 1854, a few months prior to Coffin's congressional testimony, Henry recruited Coffin to hire and oversee a team of data computers charged with reducing the massive backlog of submissions.¹⁹¹ As a professor of mathematics and natural philosophy at Lafayette College, author of an earlier 1854 Smithsonian publication titled *Winds of the Northern Hemisphere*, and Smithsonian meteorological observer, Coffin understood both Henry's goal to promote abstract science as well as the intricacies of the meteorological project itself. When drafting a plan of operation and expenses for the data reduction, Coffin identified the two primary purposes driving the much anticipated undertaking; "1st To satisfy the observers who contribute the material, & show them that their labors are not in vain, but will in due time yield valuable fruit, thus encouraging them to persevere;—2nd & mainly, to furnish such data as will be of the greatest use to meteorologists and their investigations, & as great an amount as is compatible with the means of the institution."¹⁹² While Henry's mission to create a dataset for furthering abstract meteorological investigation was his primary goal, satisfying the demands of observers in the extended scientific network was a necessary and noteworthy objective for the project's perseverance.

In addition to the existing expenses of the meteorological project, the extensive labor required to calculate reduced and publishable data threatened to overwhelm the Smithsonian's budget. According to Rothenberg et al., "It took three full-time workers just to reduce the current observations as they came in. Additional labor was required to reduce the backlog of past

¹⁹¹ Rothenberg et al., *The Papers of Joseph Henry*, 9: xxviii.

¹⁹² Perhaps hoping to reassure Henry of his loyalties, Coffin also firmly stated that "I differ entirely from our friend Blodgett [sic], who thinks it more important to work out results at the Institution, than to afford data for others elsewhere to do so...." Coffin to Henry, November 20, 1854, in *The Papers of Joseph Henry*, 9, eds. Rothenberg et al., 154.

observations, as well as for ‘the deduction of general principles.’”¹⁹¹ Coffin assembled a staff of data computers, many of them women in Easton, Pennsylvania, to undertake the enormous task.¹⁹³ The demands and expectations of the meteorological observers placed significant pressure on Henry to search for additional resources if he hoped to maintain the volunteers’ confidence and contributions. In his description of meteorological operations for 1855, Henry reports that “Complaints have been made that but few of the materials collected by the Institution have yet been published. The answer to these, however, is readily given in the fact that so much of the income up to this time has been devoted to the building, and so many demands have been made upon the Smithsonian funds for objects requiring more immediate attention...” He further argued to those who might read the report, “it is more important that the information should be reliable than that it should be quickly published. The value of observations of this character increases in a higher ratio than the time of their continuance, and, therefore, what may be lost by delay is more than compensated by the precision and value of the results.”¹¹⁸ Meeting the meteorological project observers’ pervasive expectations and demands for publications, instruments, communications, and reduction and distribution of project data would be impossible within the Smithsonian’s limited finances without external support.

To maintain observer confidence in the Institution and ensure the program’s continuance, Henry was compelled to seek an alliance with the Patent Office for financial support. In addition to granting patents, the office supported mechanisms of agricultural improvement, and Henry believed the office would be interested in the agricultural application of the meteorological data. Henry wrote to Coffin in early 1855 that he had begun communications with Commissioner of Patents, Charles Mason. Although no arrangement had yet been made, he authorized Coffin to

¹⁹³ Rothenberg et al., *The Papers of Joseph Henry*, 9: xxviii and 212n.

commence operations as he felt that financial assistance from the Patent Office was “probable.”¹⁹⁴ Several months later, perhaps feeling the financial risk of initiating the reductions without yet receiving confirmed funding, Henry strongly appealed to Mason to invest in the project, “I therefore beg to suggest that the Patent Office unite with this Institution and its meteorological investigations; that a common plan be adopted— joint circulars issued and the expenses divided in accordance with an agreement which may be determined on.”¹⁹⁵ By November, Henry satisfactorily reported to Coffin that an arrangement with the Patent Office was nearly resolved and that detailed plans for publications should be discussed for the data’s inclusion in the next Patent Office report’s appendix.¹⁹⁶ Henry announced the arrangement, Coffin’s progress with reducing the data, and the Institution’s impending meteorological publication in the subsequent Smithsonian report. He assured observers who received the report that “an arrangement has been made with the Commissioner of Patents by which the system of meteorology, established under the direction of the Institution, will be extended, and the results published more fully than the Smithsonian income would allow.”¹⁹⁷

In addition to supporting the meteorological project’s daily operations Henry’s arrangement with the Patent Office allowed him to better fulfill the observers’ constant and most prevalent demands for resources. In his annual report made one year after announcing the arrangement, Henry happily announced “this copartnership, as it may be called, has produced good results; the number of observers has increased, and the character of the instruments and of the observations has been improved.” Alongside the Patent Office, the Smithsonian developed improved blank forms which could be more widely distributed and returned under the Patent

¹⁹⁴ Henry to Coffin, April 13, 1855 in *The Papers of Joseph Henry*, 9, eds. Rothenberg et al., 237.

¹⁹⁵ Henry to Mason, July 3, 1855, in *The Papers of Joseph Henry*, 9, eds. Rothenberg et al., 256-257

¹⁹⁶ Henry to Coffin, November 29, 1855, in *The Papers of Joseph Henry*, 9, eds. Rothenberg et al., 295.

¹⁹⁷ SI, *Tenth Annual Report*, 26-27.

Office's franking privilege. This franking privilege would also facilitate the distribution of desired publications and any observer correspondence with the Institution. Additionally, the Patent Office funding provided for revitalized distribution of instruments to volunteers, including over 100 rain gauges for the improvement of precipitation measurements.¹⁹⁸ Furthermore, the financial support of the Patent Office enabled Coffin and his computers to complete the reductions and summary of data for 1854 and 1855 and allowed the long-desired institutional publication of the summary of meteorological work in the 1856 Patent Office agricultural report. Publication of fully reduced datasets and additional publications followed in the next five years under the support of the Patent Office. Meteorological tables describing average and extreme temperatures, rainfall, and observations of the sky at select localities were published in the Patent Office's *Annual Reports* for 1857 and 1858. Although the data preceding 1854 was never systematically reduced and published, the entirety of observation data for 1854 through 1859 were reduced and eventually published in a single volume in 1861 and tables of periodical phenomena were published in 1864.¹⁹⁹

The Practical Agricultural Interests of Observers and the Patent Office

Beyond any concern for advancing abstract scientific principles, Charles Mason and the Patent Office were more interested in the meteorological program's data from an agricultural perspective. Before the establishment of the Department of Agriculture in 1862, Congress provided an appropriation to the Patent Office to collect agricultural data and support investigations into agricultural improvement. According to James Rodger Fleming,

¹⁹⁸ Smithsonian Institution, *Annual Report of the Board of Regents of the Smithsonian Institution Showing the Operations, Expenditures of the Institution, and Conditions of the Institution, for the year 1856 and the Proceedings of the Board up to January 28, 1857* (1857), 34-35 (hereafter cited as SI, *Eleventh Annual Report*).

¹⁹⁹ See note two, Rothenberg et al., *The Papers of Joseph Henry*, 9: 259;. For inability to reduce and publish data preceding 1853, see Rothenberg et al., *The Papers of Joseph Henry*, 9: xxviii.

“Commissioner of Patents Charles Mason considered this information essential for a system of scientific agriculture and promised farmers a new level of support. ...”²⁰⁰ While Henry saw the Congressional appropriation as a solution to his critical budgetary constraints, Mason recognized the value that the project and its data held for research into meteorology and climatology and the potential such knowledge might have on agriculture.²⁰¹ In exchange for financially sponsoring the meteorological project’s activities, Mason required that Henry compose practical meteorological essays for the Patent Office’s agricultural reports. In a letter from Henry to a scientific colleague, he explained his involvement in agricultural work, ““I am under an engagement with the Patent Office to furnish annually for the agricultural report a certain amount of matter relative to this subject in repayment for some facilities received from this establishment.””²⁰²

The agricultural reports required by Mason served a dual purpose in fulfilling the expectations of many observers that the meteorological data would serve both a practical interests and benefit agricultural science. Rothenberg et al. point out that Henry perhaps understood that the agricultural reports “assured the Smithsonian’s volunteer meteorological observers, many of whom were farmers, that their observations were important and that the data they had provided were useful. ...”²⁰³ His series titled “Meteorology in Its Connection with Agriculture” won high favor with farmers especially. Theodore Brown, a farmer from St. Matthews, Kentucky, wrote to Henry after reading an installment in the series:

To say that the perusal interested me is ‘faint praies’ [sic]; I hope to derive much profit from the light shared upon many of the processes of nature, and as you justly remark the information conveyed ‘is not readily accessible’ to those who must depend mainly upon

²⁰⁰ Fleming, *Meteorology in America*, 125.

²⁰¹ Rothenberg et al., *The Papers of Joseph Henry*, 9: xxviii-xxix.

²⁰² Letter quoted in Rothenberg et al., *The Papers of Joseph Henry*, 9: xxxiv-xxxv.

²⁰³ Rothenberg et al., *The Papers of Joseph Henry*, 9: xxxv.

Bookstores—I am one of the farmers who look for great improvement to Agriculture from the application of science in its various branches, and perhaps Meteorology as a science is less understood by farmers than any other. [Its] value however would be acknowledged by many even of the practical farmers who scoff at science generally as of any utility to them. I hope great progress will be made in Meteorology from the systematic + widely extended efforts being now made in our country under the direction of the Smithsonian Institution and the Patent Office...²⁰⁴

Observer James W. Tolman of Winnebago, Illinois similarly wrote to Henry in 1859 that “Those “Reports are to me, as a farmer, almost invaluable: as hardly a day [passes] without an occasion to consult these papers for advice or information ...all the spare time I have is at your service.”²⁰⁵ Although utilizing the meteorological data for agricultural research contradicted Henry’s intended purpose for the project, the practical reports helped renew commitment from volunteers and secure continued data collection.

Henry’s agricultural meteorology reports for the Patent Office and their practicality inspired many farmers to become involved in the Smithsonian Meteorological Project, fundamentally changing the occupational makeup of the program. Participation in the project increased overall, first restoring the number of volunteers to pre-Blodget Affair participation and eventually achieving the project’s peak of over 500 observers in 1859-1860.²⁰⁶ Through his examination of observer occupations over time, Fleming finds that the percentage of farmers particularly increased from eight percent in 1851 to seventeen percent by 1860 in the sample he surveyed.²⁰⁷ After reading the Patent Office’s 1857 agricultural report and learning about the meteorological project volunteers, Henry S. Babcock wrote to Henry from Westfield, Iowa in 1859, “as I am deeply interested in the subject, and am now in a position to give it requisite time + attention, I should like much to be a colaborer [sic] in this extensive field for research. I would

²⁰⁴ Brown to Henry, October 31, 1859, Box 7, SMP, Letters received, National Archives.

²⁰⁵ Tolman to Henry, May 2, 1859, Box 7, SMP, Letters received, National Archives.

²⁰⁶ See graph data, Fleming, *Meteorology in America*, 82.

²⁰⁷ This trend continued past the Civil War as well as Fleming finds farmers composed thirty-seven percent of observers by 1870, Fleming, *Meteorology in America*, 91.

add, that our young and prosperous state is being rapidly settled by an agricultural people, and, therefore more attention should yearly be given to its meteorology.”²⁰⁸ Fleming acknowledges that the increased constituency of farm worker volunteers such as Babcock also created an increase in their particular demands and pressure for resources from the Smithsonian to address the needs of practical, agricultural science.²⁰⁰

The Patent Office’s requirement that Henry provide regular agricultural reports in combination with the heightened demand from observers for agricultural results and resources influenced the ultimate products of the Smithsonian Meteorological Project research. Despite his determination to promote research and the “increase” of abstract scientific knowledge, Rothenberg et al. state that due to his agreement with the Patent Office “Henry’s most important scientific publications during this period were in the sphere of the diffusion of knowledge, rather than its increase.”²⁰⁹ The office prompted Henry to spread practical meteorological knowledge instead of encouraging work that developed abstract principles from the data. Following his summary of the first successful year of the Patent Office partnership, Henry attempted to curb expectations and demands for practical results in hope that the project would remain primarily in the focus of theoretical scientific research efforts.

We cannot hold out the idea that great results are at once to be obtained for the improvement of agriculture... There are no royal roads to knowledge, and we can only advance to new and important truths along the rugged path of experience, guided by cautious induction. We cannot promise to the farmer any great reduction in the time of the growth of his crops, or the means of predicting with unerring certainty, the approach of storms. But in the course of a number of years the average character of the climate of the different parts of the country may be ascertained, and the data furnished for reducing to certainty, on the principle of insurance, what plants can the most profitably cultivated

²⁰⁸ Babcock to Henry, August 9, 1859; Box 4, Series 1, SI MP, Smithsonian Institution Archives.

²⁰⁹ Rothenberg et al., *The Papers of Joseph Henry*, 9: xxxiv.

in a particular place... We make these remarks in order to prevent disappointment and the evils produced by exciting expectations which cannot possibly be realized.²¹⁰

Fleming describes that ultimately “no flood of theoretical studies” resulted from the Smithsonian meteorological data. However, the works that did derive from the project were “undoubtedly of use to agriculturalists, educators, and settlers on the American frontier.”²¹¹ Despite Henry’s intentions, the demands of observers and the financial requirements to meet those demands deeply intertwined the meteorological project and the Smithsonian Institution at large with the utilitarian interests of the extended scientific community and those of the wider public culture of science.

Conclusion

Elite men of science did not ubiquitously shape American scientific practice and scientific institutions in the mid-nineteenth century. Enduring notions of American science as a force for direct utilitarian advancement and public intellectual improvement clashed with early efforts by men such as Joseph Henry who sought to shift this sense of legitimate science from the publicly-involved practical model to one of formal scientific practice under the authority of specialists in the United States. Such practical designs and a republican ideology of American science remained a strong force in mid-century society— shaping discourse in the popular press and the expectations of members of the wider scientific community that extended beyond elite centers of practice. Both popular publications and members of this extended scientific community expressed a belief that the newly established Smithsonian Institution and its mission would directly serve the practical scientific needs of the American people.

²¹⁰ SI, *Eleventh Annual Report*, 36-37.

²¹¹ Fleming, *Meteorology in America*, 139-140.

Analyzing the correspondence of the Smithsonian Meteorological Project complicates the boundaries between Henry's efforts to establish a major data collection project in the pursuit of advancing abstract and theoretical scientific work and the efforts of the extended scientific community who Henry relied on as volunteer data collectors. Volunteer observers were not passive participants contributing data but scientifically minded individuals making demands upon the Smithsonian's resources to pursue their own intellectual advancement and, often more practical, goals. While Henry could rebuff his detractors in the press and defend his plan of operations and vision for the Smithsonian as an institution principally supporting formal theoretical scientific inquiry by select men rather than the wider public, he could not so easily refuse the demands of volunteer observers who leveraged their contribution to gain access to the Smithsonian's restricted resources.

Although observer backgrounds and motivations varied, several frequent demands emerged in their correspondence. Observers frequently demanded Smithsonian publications; a resource often pressed for by the American public but limited in distribution by Henry due to its production taxing the Institution budget. While Henry otherwise only distributed these to comparable intellectual institutions and government entities, he specifically allocated editions for the individual meteorological observers. Henry also attempted to widely distribute meteorological instruments to observers, but when overwhelming demand could not be met within the Institution's budget and resources, careful responses were crafted to assuage the volunteers. Personal attention, encouragement, and scientific expertise from the Smithsonian was additionally demanded throughout observer correspondence with the Institution. To meet these communication needs, Henry allocated Smithsonian funds to hire assistants dedicated to the correspondence, despite observer inquiries often falling outside of his own definition of

legitimate scientific work. Significantly, observers sought to see the work they contributed published and utilized in the advancement of meteorology. Their expectations combined with and bolstered political entities that challenged the Institution's ability to produce results, placing notable pressure on Henry to procure resources to reduce and publish the meteorological data at the detriment of his own intentions for the project's ultimate scientific contribution. Meeting observers' varied demands and supporting their disparate goals to enable the success of the meteorological project deeply intertwined Henry's own goals to advance theoretical meteorological science with the more practical interests of the wider American culture of science.

The consequences of Henry's decision to obtain financial support for the meteorological project by partnering with the Patent Office also significantly interwove the Smithsonian Institution at large with the public and its interests. Not only did the agreement with the Patent Office divert the meteorological project toward supporting more practical and popular agricultural science, but this closer relationship between the two entities additionally resulted in the transfer of the Wilkes Exploring Expedition collection to the Smithsonian. Although the details and extent of the connection between Henry's compromise with the Patent Office regarding the office's contribution to the meteorological project and his reconsideration of the Exploring Expedition collection, the negotiations surrounding both subjects seemingly occurred simultaneously. Henry began soliciting a partnership with the Patent Office in the spring of 1855 and subsequently arranged shared responsibility for financially supporting the meteorological project by the time he wrote his annual report in January 1856 which announced the final

agreement.²¹² Two months later, on March 22, Henry cooperatively reversed his previous stance on the Exploring Expedition collection and prompted the regents to reconsider the Patent Office's offer.²¹³ The pressure exerted on Henry by observers and the demands of the meteorological project placed Henry in a vulnerable position when negotiating the Smithsonian's new relationship with the Patent Office and seemingly forced Henry to accept the popular national museum collections he viewed as depreciative to the Institution's true mission.

Even after proposing the transfer of the Wilkes Exploring Expedition collection to the Smithsonian, Henry continued to express the desire to rid the Institution of its museum. He was highly aware that housing the national collections made him more accountable to fulfilling the public demands for exhibitions. This would require that Smithsonian funds and attention be diverted from theoretical scientific research and publications and shifted toward maintaining and displaying the collection for the public. When compromising with the Patent Office, he perhaps only saw adoption of the Exploring Expedition collection as temporary, reverting to previous hopes that the government would purchase the Smithsonian building and support the unified national collections housed within its space. On April 6, 1857, he wrote to fellow leader, Asa Gray, expressing his aversion to the upkeep of popular exhibitions and implying his hope to see the Institution relieved of the expense in due time.

It is necessary to fit up this museum and that of the institution so as to produce a good popular effect or at least that part of the Museum of the institution which is intended for public exhibition. ... and if we can make the establishment popular I doubt not that in due time we shall be relieved from the expense, if not the care of a museum. It does not

²¹² For information on Henry soliciting an arrangement with the Patent Office, see Rothenberg et al., *The Papers of Joseph Henry* 9: xxxi; Although the annual Smithsonian report produced in 1856 was not officially submitted until May, it must be noted that the secretary's report announcing the Patent Office agreement is noted as completed by Henry in January, SI, *Tenth Annual Report*, 26-27, 35.

²¹³ SI, *Tenth Annual Report*, 80; Rothenberg et al. also recognize the coincidental timing of Henry's reconsideration of the Exploring Expedition collection with Henry's deal with the Patent Office for meteorological project funding, Rothenberg et al., *The Papers of Joseph Henry* 9: xxxi.

become the dignity of the institution to do anything for popular effect on its own account but as the custodian of the government property it will be obliged to do something in the way of display.²¹⁴

The partnership between the Patent Office and the Smithsonian Meteorological Project continued until it was terminated in 1861 by a newly appointed Commissioner of Patents. The agricultural character adopted by the project in its relationship with the Patent Office likely facilitated its subsequent sponsorship by the newly created Department of Agriculture, which supported the project and published its data in the department's *Monthly Reports* until 1872.²¹⁵ Lacking financial resources to continue, Joseph Henry willingly relinquished the project to the public national weather service arm of the U.S. Army Signal Office in 1873.²¹⁶

While the Patent Office meteorological partnership proved short-lived and the Smithsonian Meteorological Project did not outlast Joseph Henry's tenure as secretary, the national collections remained with the Smithsonian Institution and remained popular with its public visitors. As Henry predicted in the Smithsonian's *Fourth Annual Report*, the extensive national collections continued to grow rapidly and by 1878, required the Institution appeal to Congress for an appropriation to build a second Smithsonian building for housing and publicly displaying the National Museum collections.²¹⁷ The growth of these collections during Henry's tenure was largely directed by museum assistant turned Assistant Secretary Spencer Baird.²¹⁸ Baird did not share Henry's understanding of the Smithsonian bequest as exclusively intended to primarily support theoretical scientific research and publication, but rather envisioned a national

²¹⁴ Henry to Gray, April 6, 1857 in *The Papers of Joseph Henry*, 9, eds. Rothenberg et al., 446- 447.

²¹⁵ Fleming, *Meteorology in America*, 127-128.

²¹⁶ Fleming, *Meteorology in America*, 161; See pages 152-156 for information on the establishment of the federal storm warning system in the U.S. Army Signal Office.

²¹⁷ SI, *Fourth Annual Report*, 20; For information on the National Museum see William Healey Dall, *Spencer Fullerton Baird: A Biography, Including Selections from His Correspondence with Audubon, Agassiz, Dana, and Others* (Philadelphia, PA: J.B. Lippincott Company, 1915), 413-414.

²¹⁸ Baird was initially appointed in July 1850, for more information on Baird's role see Rothenberg et al., *The Papers of Joseph Henry* 8: xxiv-xxv.

museum for the increase and diffusion of knowledge. Upon Henry's death in 1878, Baird assumed the role of Secretary of the Smithsonian Institution and implemented his own plan to expand the Smithsonian's established national collections responsibilities and develop an extensive National Museum program.²¹⁹

Although elite men of science sought to establish boundaries between professional theoretical and practical amateur practice and build institutions to advance this vision, wider republican understandings of American science remained a powerful force in the creation of such institutions. Rather than becoming an institution dedicated to the promotion of professional science, the demands made by extended scientific community for resources both altered the course of the Smithsonian Meteorological Project to serve more practical agricultural ends and influenced Henry's decision to accept a collection that ultimately transformed the Smithsonian from an organization primarily dedicated to specialized scientific research and publication to a public-oriented museum complex.

²¹⁹ Baird's contemporary, William Healey Dall states that even earlier than his appointment as Secretary "the establishment of a real National Museum was [clearly] the aim and ambition of Professor Baird;" Dall, *Spencer Fullerton Baird*, 409.

Chapter Three

Data Collection from the Periphery: Women and the Obscured Role of the Scientific Household in the Antebellum Smithsonian Meteorological Project

On April 3, 1858, Miss E.L. Smith wrote to the Secretary of the Smithsonian Institution to inform him that meteorological observations would likely cease at G.W. Brown's station in Lawrence, Kansas.²²⁰ This was not due to Brown's dissatisfaction with Smithsonian resources or lack of data publication, but because G.W. Brown had not been conducting any of the observations from Lawrence for some time. Smith explained, "I came into Mr. Brown's employ as clerk in May 1857 [and] in July commenced taking note of the mercury and weather— but not knowing how long I should remain here, gave Mr. Brown as "observer," when in fact, he has had nothing to do with it. I am now about to leave and presume that it will be neglected."²²¹ The Smithsonian's published list of observers for the year 1857 had solely credited G.W. Brown.²²² However, Smith revealed that in reality, Brown had "nothing to do with" the daily data collection and regular submission of meteorological records. As part of her duties as clerk, she recorded temperature data from the mercury thermometer at the four times designated by Smithsonian instructions and recorded observations of weather phenomena such as wind direction, cloud formations, and precipitation times. Her work would have been highly valuable to the Smithsonian Meteorological Project as Smith's station was one of the first established in

²²⁰ Potentially George Washington Brown, publisher and editor of the *Kansas Herald of Freedom* in Lawrence, Kansas from 1855-1859, see "About The Kansas herald of freedom.," *Chronicling America: Historic American Newspapers*, The Library of Congress, accessed February 12, 2023.

²²¹ Smith to Henry, April 3, 1858, Box 3, SI MP, Smithsonian Institution Archives.

²²² Smithsonian Institution, *Annual Report of the Board of Regents of the Smithsonian Institution Showing the Operations, Expenditures, and Condition of the Institution, and Conditions of the Institution for the Year 1857* (1858), 64 (hereafter cited as SI, *Twelfth Annual Report*).

the Kansas Territory and data from frontier regions were scarce.²²³ Yet, while she conducted the scientific labor and signed Brown's name, Brown received sole credit and likely benefits of involvement, such as Smithsonian publications.

It is unclear if Smith held any personal interest in science and meteorology, or if the record keeping was simply part of her job description. However, from her decision to reveal her role and her firm pronouncement that Brown had nothing to do with her work, it is reasonable to consider that she was somewhat resentful of her miscredited contribution and sought acknowledgement. If she had not desired recognition, she might have let Brown, in name or personally, inform the Smithsonian of potential discontinuance or simply let the communication lapse upon her departure. Although it is unknown whether Smith received a response to her disclosure, she again went unnamed in the official list of Smithsonian observers for the year 1858 and was still missing from a later aggregated list of all credited observers from 1849 through 1868.²²⁴

The unacknowledged role that E.L. Smith played in the Smithsonian Meteorological Project was not unique to her circumstances. Many women performed daily meteorological project duties while their male relatives, and occasionally employers, claimed credit and reaped the benefits of belonging to the meteorological network. Smith may be unique in that she personally disclosed her uncredited work that appeared under a male name. Most individuals not

²²³ The observer list for the year 1857 contains the first appearance of "Kansas" as a designated place of observation. Only five observers were initially listed in the territory, see SI, *Twelfth Annual Report*, 64; for the absence of Kansas from prior observer station lists, see previous Annual Reports, including SI, *Eleventh Annual Report*, 69.

²²⁴ Brown is listed as the sole observer at Lawrence, Kansas in the published observer lists for the years 1857-1859; Smithsonian Institution, *Annual Report of the Board of Regents of the Smithsonian Institution, Showing the Operations, Expenditures, and Condition of the Institution, and Condition of the Institution Up to January 1, 1859, and the Proceedings of the Board up to February 15, 1859* (1859), 72 (hereafter cited as SI, *Thirteenth Annual Report*); Smithsonian Institution, *Annual Report of the Board of Regents of the Smithsonian Institution, Showing the Operations, Expenditures, and Condition of the Institution, and Condition for the Year 1868* (1872), 73 (hereafter cited as SI, *Twenty-Third Annual Report*).

credited in the published lists of observers may only be traced through passing mention in correspondence of the more empowered men who claimed their work. Like with Smith, it is often difficult to discern how these individuals viewed their role in the meteorological project and their own degree of personal interest in science. While some women may have viewed the observations as a tedious household chore, others may have enjoyed conducting the scientific observations and used the data for their own research pursuits.

Not all women who contributed to the project went unnamed in the observer list either, as the more porous borders of mid-century American public science allowed women varying degrees of access to the extended scientific community. Such women participated in the project as direct correspondents who submitted data, inquiries, and like many men who corresponded with the Smithsonian, requested resources from the Smithsonian in exchange for their efforts. Other named women who gathered data did not participate in scientific correspondence networks themselves but were identified as contributors by male correspondents of the Smithsonian Meteorological Project and their work was deemed notable enough for their inclusion in official observer lists.

In her study of the wives of elite, professional nineteenth-century men of science, historian Debra Lindsay asserts that “the culture of science established a framework for intellectual activity within the scientific household.”²²⁵ This finding is also evident in the culture and context of the extended scientific community and the meteorological project’s less formal daily operations. In the Smithsonian’s *Annual Report* published in 1852, project assistant Edward Foreman stated that “the observers are generally persons engaged in occupations which admit to some extent of their being present at the place of observation at the required hours of the day all

²²⁵ Debra Lindsay, “Intimate Inmates: Wives, Households, and Science in Nineteenth-Century America,” *Isis* 89, no. 4 (December 1998): 651.

year round. The services of an intelligent substitute is sometimes made available.”²²⁶ As indicated by Foreman, consistent presence at an observer’s meteorological station, frequently their household or in close proximity to their residence, was only feasible “to some extent” for observers. By the mid-nineteenth century, ideological gendered divisions of labor were “built on the assumption that the household was no longer the place of production,” as the United States shifted from an agricultural to market-based economy.²²⁷ Although there were women who worked and participated in the public sphere, an ideological division between the “public” and “private” spheres remained a facet of American life. Women’s labor—especially that of middle-class women—was relegated to the “private sphere” and men were ideologically urged to conduct their business or find occupations external to the household.²²⁸ While such distinct divisions were ideological, and the realities of work and culture far more complex, women’s more fixed, ideal center of labor was better located to meet the practical demands of daily meteorological data collection and perform this particular type of scientific work than that of the men who may have been listed as the official observer from their station.

Historian of science Sally Gregory Kohlstedt recognizes that despite women’s involvement in scientific pursuits throughout the nineteenth century, the scope of their work is made nebulous by social forces that sought to keep them on the periphery of science and curtail their public recognition. “Their efforts to participate in and be recognized by that community were cautious and sometimes circuitous, a product of the social and intellectual climate of the times... socialization as helpmates and lack of independent credibility meant that many women assisted male researchers, and they rarely achieved recognition commensurate with their

²²⁶ SI, *Sixth Annual Report*, 77-78; The forms required observations be taken at sunrise, 9:00 AM, 3:00 PM, and 9:00 PM (with later adjustment to 7:00 AM, 2:00 PM, and 9:00 PM to account for inconsistent sunrise time).

Fleming, *Meteorology in America*, 81-82

²²⁷ Ryan, *Cradle of the Middle Class*, 147.

²²⁸ Ryan, *Cradle of the Middle Class*, 189-190.

skills.”²²⁹ These qualities of women’s scientific involvement are evident throughout the meteorological correspondence as their roles were characterized as assistive, secondary, or associative to male observers.

While they may have been more practically positioned to perform the project’s duties, the scope of women’s actual involvement and interest in the Smithsonian Meteorological Project is difficult to ascertain through the perspectives presented in archived correspondence. Both men and women often sought to downplay or reshape women’s contributions into a more socially acceptable form. In her own evaluation of the gendered experiences of several white women who took part in the Smithsonian Meteorological Project’s correspondence network, environmental historian Sara J. Grossman accurately states that the project “[positioned] masculine skills at the center of meteorological data labor and women’s data labor at its edge.”²³⁰ Even women who

²²⁹ Sally Gregory Kohlstedt, “In from the Periphery: American Women in Science, 1830–1880,” *Signs* 4, no. 1 (1978): 81.

²³⁰ Sara J. Grossman, “Gendering Nineteenth-Century Data: The Women of the Smithsonian Meteorological Project,” *Journal of Women’s History* 33, no. 1 (2021): 85; Grossman’s examination of women’s correspondence separately from the whole of the collection results in some cases of mistaking “general trends of women volunteers” which actually appear as trends experienced by volunteers of all genders. This includes her argument that women experienced more delays or were more frequently denied instruments and “blanks” (blank monthly record sheets). However, evidence of requests for blanks and instruments and delayed responses are widely prevalent throughout the entire meteorological correspondence, making it difficult to detect gender bias as a cause. Her reading of Harriott Baer’s letters in which Baer repeatedly requested blanks over the course of a year is more representative of regular project operations than her requests being ignored or her needing to “beg” for resources. Although Grossman cites that male counterparts did not need to request or “beg” for blanks and instruments to the degree that women did, many male participants clearly did send a multitude of requests for blanks, were denied instruments, and experienced lapses in communications. In fact, “send blanks” is one of the most common phrases in the meteorological correspondence collections. Her argument that Anna Bowen was specifically denied a rain gauge due to her gender is also somewhat disrupted by evidence that Dr. H. Munger of the Elkhorn Literary and Scientific Association, the group for which Bowen conducted the observations, requested and was seemingly refused Smithsonian instruments on the group’s behalf before Bowen began writing to the Smithsonian herself. While it is undeniable that women did not participate in the project with the same opportunities as men, women’s requests in these specific examples do not appear qualitatively distinct from many male correspondents. While some men did receive more resources than other meteorological observers, including many women, examining gender alongside other factors such as education, occupation, class, location, and political connections would provide more nuanced and realistic insight into some of the disparities between observers; For Grossman’s arguments regarding Baer see Grossman, “Gendering Nineteenth-Century Data,” 95; For Grossman’s description of Bowen’s denial of instruments see Grossman, “Gendering Nineteenth-Century Data,” 91; For persistent requests for blanks and frequent lapses in communications see SI MP, Smithsonian Institution Archives, or see SMP, Letters received, National Archives; For a multitude of rejections to observers seeking instruments, see Box 1, SMP, Letters sent, National Archives; For

were officially listed as observers often had to rely on men to justify their involvement or act as facilitators of their relationship with the Smithsonian Institution, despite possessing their own scientific interests and competencies.²³¹

Informal educational opportunities—such as lectures, associations, and publications—provided by the popularization of natural sciences in the first half of the century allowed women some access to spaces of scientific discussion and inquiry. Women’s education increased throughout the century as a whole, granting women more formal learning opportunities as well.²³² However, the growth of women’s education was largely built from early concepts of republican motherhood, limiting socially acceptable uses of education to the schooling of children and future citizens in the “domestic sphere” rather than encouraging professional development or personal inquiry.²³³ Kohlstedt describes that most women “educated into the ‘cult of true womanhood,’ were taught that intellectual achievement for its own sake was not a virtue.”²³⁴ While enduring structures of public science remained more accepting of women’s scientific involvement, nineteenth-century gender norms encouraged women to exercise discretion in their scientific pursuits. The growing efforts to professionalize American science contrarily required visible participation in professional association meetings and the publication and presentation of research. Such frameworks further limited women’s ability to be seen as legitimate contributors of scientific knowledge. Despite such obstacles, Kohlstedt additionally

correspondence from Dr. H. Munger, Secretary of the Elkhorn Literary and Scientific Society, see Munger to Henry, Elkhorn, Nebraska, February 22, 1858, Box 3, SI MP, Smithsonian Institution Archives.

²³¹ Grossman, “Gendering Nineteenth-Century Data,” 96.

²³² Kohlstedt, “In from the Periphery,” 86.

²³³ Sally Gregory Kohlstedt, “Introduction,” in *History of Women in the Sciences: Readings from ISIS*, ed. Sally Gregory Kohlstedt (Chicago, IL: University of Chicago Press, 1999), pp. 1-9, 4.

²³⁴ Kohlstedt, “In from the Periphery,” 90.

acknowledges that “women [in the nineteenth century] were expanding their activities, testing alternative roles, and enjoying new challenges.”²³⁵

Debra Lindsey further examines women’s roles as helpmates to husbands engaged in professional scientific work and argues that it is necessary to move away from historical frameworks that tend to prioritize struggle for status, accreditation, and official forms of recognition. Rather, pursuing analysis of “the impact of the scientific community on their lives, reveals women who were immersed in a community that formally excluded them.”²³⁶ She additionally contends that women were not necessarily passive performers but could actively and creatively use cultural expectations to meet their own needs and shape their involvement in scientific work.

Although women's activities were deemed less significant than those of their male contemporaries—and the case has been made that it was to the advantage of professional scientists to minimize or undermine female contributions—the sociologist Ann Swidler points out that ‘culture’ itself provides choices to participants and that “people are not passive ‘cultural dopes’; they are active, often skilled users of culture.”²³⁶

Women actively navigated their involvement with the meteorological project within the boundaries of “true womanhood” in a variety of ways. For example, historian of science Daniel Goldstein shows how women operated within and at the periphery of the extended scientific community in his study of the Smithsonian correspondence network from the 1850’s to the 1870’s.²³⁷ While the boundaries of American popular science were more inclusive of women than the professionalizing spheres of science, it is difficult to map the totality of women’s activity and involvement. Compared with other scientific directories at the time, Goldstein finds

²³⁵ Kohlstedt, “In from the Periphery,” 91.

²³⁶ Lindsay, “Intimate Inmates,” 632.

²³⁷ Goldstein’s source uses combined correspondents lists for the Smithsonian Meteorological Project and projects for natural history specimen collection that span from the antebellum years through the 1870s, Goldstein, “‘Yours for Science’,” 577.

that women numbered less within the Smithsonian projects' correspondence lists.²³⁸ He partially attributes this to the public, national nature of work like the Smithsonian Meteorological Project. Goldstein argues that, to some extent, women of science probably internalized "social pressures that made it more difficult for them than for men to make their scientific interests public." While they might feel more comfortable joining a local directory of science, some women may have been reluctant to publicly express their interest and scientific involvement at a national level and chose to obscure their participation through the names of male relatives or associates.²³⁹

Goldstein also underscores the challenges of trying to discern the gender of individuals named in nineteenth-century scientific directories. It is difficult to obtain an exact percentage of gender as most individuals are only listed by their first and middle initials and last names, such as Smithsonian correspondent M.E. Wing of Vermont.²³⁹ Without additional research, it would be impossible to know that M.E. Wing, an observer officially listed in the Smithsonian Meteorological Correspondents list for the year 1868 was actually Minerva E. Wing.²⁴⁰ Goldstein acknowledges the limitations of his sources and that they likely offer a very conservative perspective on women's actual involvement in nineteenth-century scientific work.

Closer reading of scientific correspondence itself, beyond Goldstein's analysis of official directories, provides more context to the identities of some observers such as Wing. For example, in 1868 Wing responded to a solicitation she read in the Agricultural Report of 1865 that asked farmers to submit meteorological observations to the Smithsonian project. She requested the Institution "allow a 'Farmer's daughter' to note a few facts (& if they should prove

²³⁸ Goldstein most closely compares the Smithsonian data with nineteenth-century editions of the *Naturalists' Directory*, see Goldstein, "'Yours for Science'," 579.

²³⁹ Goldstein, "'Yours for Science'," 582.

²⁴⁰ SI, *Twenty-Third Annual Report*, 83.

in the lest beneficial I should feel much pleas'd.)”²⁴¹ While the majority of initialed names in scientific directories are likely men, their formatting obscured the identities of an “unknowable number” of women such as M.E. Wing.²³⁹

Like Goldstein, Grossman seemingly relies more on official lists and correspondence indices, rather than the entire correspondence itself, to gain an overarching understanding of the shape of women’s involvement in the data collection project.²⁴² While this perspective allows analysis of how women officially listed under their full names operated within largely patriarchal scientific correspondence networks, it provides a limited view of the wider reality of data collection, reduction, and submission. Seeking and analyzing evidence of individuals who were not officially named as observers provides deeper insight into the gendered operations of the Smithsonian Meteorological Project and the role played by contributors on the project’s periphery.

Close examination of the antebellum meteorological correspondence as a whole also may serve to expand racial understanding of who was involved with daily project operations. Thus far, analysis of those listed in registers shows exclusively white participation, including several slaveholders among the project’s southern observers.²⁴³ Yet, the stolen labor of enslaved men and women undoubtedly enriched slaveholders with the leisure time to participate in scientific pursuits. However, in understanding the daily demands of project data-gathering from a fixed

²⁴¹ A note at the top of Wing’s letter states that she was sent blanks by the Smithsonian on April 2 to conduct regular observations; Wing to the Smithsonian Meteorological Project, Charlotte, Vermont, March 23, 1868, Box 6, SI MP, Smithsonian Institution Archives.

²⁴² Grossman states that “from 1849 to 1859, twenty-nine women volunteers from across the nation collected data for the Meteorological Project and reported to the Smithsonian under traditionally female names.” She cites this data as collected by herself but does not explain the exact methodology or sources used to obtain this understated number, Grossman, “Gendering Nineteenth-Century Data,” 89.

²⁴³ However, like gender, race can be difficult to detect in official directories and lists. While gendered involvement is more detectable in the correspondence itself, race is less apparent. Previous analysis and comparison of a sample of observers with census records have thus far shown the project as restrictive to white involvement, see Fleming, *Meteorology in America*, Goldstein, “‘Yours for Science’,” and Grossman, “Gendering Nineteenth-Century Data;” Slaveholders can be identified through comparing the names and Southern localities in the Smithsonian observer lists with the 1850 United States Federal census and slave schedule.

location, a more direct role by these men and women might be considered. While the full extent of who participated and how they participated is difficult to ascertain through written records (and the mandates of anti-literacy laws that likely limited such circumstances) evidence from the correspondence points to the possibility that some enslaved people may have performed the work of the project when slaveholders were otherwise occupied.

Such observation work ostensibly performed by enslaved individuals would have allowed slaveholders to enjoy a connection with the Smithsonian and make claims upon its publications and resources while not being tied to one location in their daily business or leisure. However, unlike white women, whose visibility, involvement, and opportunities within the project ranged and occurred under exceedingly different forms of inequality, the roles of enslaved individuals would have been far more circumscribed. Any data collection performed by them is almost entirely invisible in the examined correspondence records, and their voices and identities are suppressed in the dominant narrative.

Goldstein describes the map of nineteenth-century American scientific practice as too socially complex to analyze from one system of categorization. In obtaining a more accurate understanding of the scientifically involved population “the result is not necessarily tidy, nor does it provide a convenient description of the [scientific] community.”²⁴⁴ While close reading of the meteorological correspondence reveals a more diverse participant group in the project than official registers suggest, it must be emphasized that the letters, most often written from the perspective of white, male observers, do not account for the full motivations, interests, or agency of contributors relegated to the periphery.²⁴⁵ While these individuals performed essential

²⁴⁴ Goldstein, “‘Yours for Science’,” 594.

²⁴⁵ Perhaps the word “contributors” is too general to denote the range of roles of the studied individuals, but it has been chosen as placeholder for the complex circumstances that are too often obscured in the record but are worth further consideration.

scientific work, they were not members of the extended scientific community themselves and could not describe their own circumstances within its correspondence. White men's project letters may have periodically described others who contributed to compiling their station's data record. However, such indication often went no further than passing mention, secondary to their own goals and involvement. Examining this evidence provides no tidy, convenient, or complete description of the individuals found on the periphery of extended scientific networks of the mid-nineteenth century. Close reading of the Smithsonian meteorological correspondence presents a more accurate but complex depiction of who was performing regular data collection and further expands an understanding of who contributed to scientific projects in the mid-nineteenth century.

This chapter examines how the structure of the Smithsonian Meteorological Project additionally relied on individuals outside of the correspondents who directly received institutional credit and resources. Although these individuals might not be considered active members of the extended scientific community and were not granted equal recognition or opportunity to advance a career or interest in meteorology, their contribution at the periphery of American science enabled early large-scale data work at the Smithsonian Institution. Moreover, the project's involvement of both men outside of scientific elite circles and the regular reliance on women and others classified as "dependents" to perform volunteer data collection labor in the background depreciated scientific elite perspectives of data collection work. If such work could be performed by these individuals, it no longer granted indication of higher status or exclusive ability, despite its association with the respected Smithsonian Institution. While some white women were able to carve out niches of scientific involvement in the Smithsonian Meteorological Project, the devalued data collection role of periphery contributors set an

important precedent for divisions of intellectual labor that later solidified in professional scientific frameworks by the end of the century.²⁴⁶

Substitutes and Assistants: Unlisted Women of the Meteorological Project

Women participated in the Smithsonian Meteorological Project from its earliest year of operation. Eliza Young of Springdale, Kentucky was included in the Smithsonian's first list of observers published in the *Annual Report* for the year 1849.²⁴⁷ However, none of the published lists or her own correspondence use the name Eliza. Rather, she assumed the role of observer and correspondent in the public project through her identification with her husband and was referred to as "Mrs. L. Young" or "Mrs. Lawrence Young" in the observer lists throughout her association with the Institution. In the *Annual Reports* published in 1852, 1853, and 1854, her name was even replaced entirely by her husband's "Lawrence Young" at their locality.²⁴⁸ A later composite list of all Smithsonian observers and the years they submitted records corrected the record for these years and credited "Mrs. L. Young" as the sole contributor of all observations

²⁴⁶ Historian of women in American science, Margaret Rossiter states "[Women's incursions in science] brought on a crisis of impending feminization, and a series of skirmishes in the 1880s and 1890s [which] resulted in [their] almost total ouster from major or even visible positions in science. Although still allowed to enter most areas of science, they could hold only subordinate, close to invisible, and specifically designated positions and memberships. In this context at least part of the so-called "professionalism" of science in the 1880s and 1890s begins to look like a deliberate reaction, conscious or not, by men against the increasing feminization of American culture, including science, at the end of the century. Ejecting women in the name of "higher standards" was one way to reassert strongly the male dominance over the burgeoning feminine presence. Thus, even though women could claim by 1920 that they had "opened the doors" of science, it was quite clear that they would be limited to positions just inside the entryway," Margaret W. Rossiter, *Women Scientists in America: Struggles and Strategies to 1940* (Baltimore, MD: Hopkins University Press, 1992), xvii.

²⁴⁷ Smithsonian Institution, *Fourth Annual Report of the Board of Regents of the Smithsonian Institution to the Senate and House of Representatives, Showing the Operations, Expenditures, and Condition of the Institution During the Year 1849* (1850), 30 (hereafter cited as SI, *Fourth Annual Report*); Eliza White Young's full name can be found in Carol Brenner Tobe's local history of the Springdale area, Carol Brenner Tobe, *Worthington and Springdale* (Charleston, SC: Arcadia Publishing, 2014), 33.

²⁴⁸ SI, *Sixth Annual Report*, 73; Smithsonian Institution, *Seventh Annual Report of the Board of Regents of the Senate and House of Representatives, Showing the Operations, Expenditures, and Condition of the Institution during the Year 1852, and the Proceedings of the Board of Regents up to Date.* (1853), 78 (hereafter cited as SI, *Seventh Annual Report*); SI, *Eighth Annual Report*, 60.

from Springdale, Kentucky.²⁴⁹ Young's husband acknowledged her role in collecting observations from their locality and endorsed her work. In a 1856 letter to the Smithsonian he stated, "Mrs. Young to whose untiring attention I am indebted for the observations furnished the department from this Station..."²⁵⁰ The scientific work of the project clearly interested Eliza Young in her "untiring attention" to the observations and her involvement for about twenty five years (the entire lifespan of the Smithsonian project).²⁵¹ Perhaps only through subsuming her identity in her husband's and his demonstrated support of her work was she able to both uphold the ideals of her gender identity and participate in the public scientific project.

While husbands, fathers, and brothers may have facilitated the involvement of women such as Eliza White Young in the Smithsonian Meteorological Project, closer reading of the project correspondence reveals that women also facilitated men's involvement in this extended scientific community. Indeed, the project correspondence provides a glimpse of women's roles and more extensive involvement beyond those listed in the official registers.

For many men who sought to belong to the Smithsonian's network, the demands of daily data collection were contrary to occupational requirements or the extent of their personal attention. In such cases, men relied on the women in their households to conduct day-to-day scientific labor. Thomas B. Merrick wrote to the project in 1848 seeking to become an observer. He admitted that he was absent from his place of residence during the workday, but assured Joseph Henry that "the Ladies in my family would with pleasure supply my place during the

²⁴⁹ SI, *Twenty-Third Annual Report*, 74.

²⁵⁰ Lawrence Young to Charles Mason, February 5, 1856, Box 2, SI MP, Smithsonian Institution Archives.

²⁵¹ Smithsonian Institution, *Annual Report of the Board of Regents of the Smithsonian Institution, Showing the Operations, Expenditures, and Condition of the Institution, and Condition for the Year 1873 (1874)*, 98 (hereafter cited as SI, *Twenty-Eighth Annual Report*).

day” although “neither they nor myself have much accurate knowledge of Meteorology.”²⁵² This proposal was seemingly acceptable to the Institution as “Thos. B. Merrick” was listed as an 1849 meteorological observer in the Smithsonian’s *Annual Report*.²⁵³ Although they ostensibly collected half of the data and their contributions were received and added to the composite data, “the Ladies” in Merrick’s family were never named nor was their contribution further acknowledged. While Sara J. Grossman observes that “Mrs. Young was noted as the only woman observer for the year of 1849,” Young was not the only woman conducting observations and collecting data in this first year of the meteorological project.²⁵⁴ Nor were the Merrick women likely alone in their unrecognized contribution, as indicated by the project’s later correspondence.

While meteorological stations were also placed at some locations of business or associations, the household served as a center of data collection work for many Smithsonian observers. Letters like Merrick’s which discuss women’s unofficial involvement in the project show how such scientific pursuits permeated households. To sustain the project work and achieve their own scientific aspirations, men enlisted other individuals from the domestic labor pool. In 1857, W. Reynolds of Iowa City, Iowa wrote to his Senator, James Harlan, seeking to become an observer and obtain Smithsonian publications as “they are nowhere for sale + can be obtained only through friends in Congrefs or by favored individuals.” Reynolds believed he could be a reliable observer, but only through the assistance of the dependents in his household. “With the help of my son + Daughter who are trained in these matters I think I can promise correct + faithful returns.”²⁵⁵ Although women in families appear most frequently in

²⁵² Merrick to Henry, New York, December 6, 1848, Box 1, SMP, Letters received, National Archives.

²⁵³ SI, *Fourth Annual Report*, 28.

²⁵⁴ Grossman, “Gendering Nineteenth-Century Data,” 92.

²⁵⁵ Reynolds to Harland, January 31, 1857, Box 6, SMP, Letters received, National Archives.

substitutional or assistant roles, letters such as Reynolds' further describe how the meteorological observations could be a household affair in which male dependents could be deputized to participate as well.

When arguing for observer entitlement to Smithsonian publications in 1851, observer Orrin Dinsmore of Emerald Grove, Wisconsin framed his demands from the perspective of his entire household. "The labor of any kind of a journal is considerable and the occasional receipt of reports and interesting matter published by the Institution, was promised, and would enlist an interest in observers and their families, indispensable to the faithful execution of the task."²⁵⁶ Although he was the only observer officially listed at Emerald Grove, Orrin Dinsmore acknowledged the considerable demands of data collection and emphasized that the entire Dinsmore family was "indispensable" to conducting complete observations for the Smithsonian. Leveraging their collective work, he argues for the household's entitlement to "interesting" publications from the Institution.

Like Reynolds, the women in Benjamin F. Wilbur's household conducted scientific work which enabled him to receive institutional credit and benefits from the Smithsonian. In 1857 he wrote from Monson, Maine that his absence from home in the past six months had kept him from conducting any meteorological work in that time. Rather, "the observations have been made mostly by my daughter-in-law."²⁵⁷ Despite her efforts, Wilbur doubted her reliability as an observer for reasons he did not identify. Wilbur expressed more confidence in the records made by his wife. In 1858, after moving to Dexter, Maine, he wrote to inform the Smithsonian that business required his additional absence from home. "My register herewith forwarded for May has been kept by my wife— I have the utmost confidence in her faithfulness as to making and

²⁵⁶ Dinsmore to Henry, December 25, 1851, Box 3, SMP, Letters received, National Archives.

²⁵⁷ Wilbur to Henry, July 20, 1857, Box 6, SMP, Letters received, National Archives.

setting down the observations to the best of her knowledge and ability in the practice.”²⁵⁸ Such absences and frequent reliance on his wife continuously characterized his involvement throughout the project. Wilbur again wrote in 1861, “My time is so much occupied about my own private affairs I have but little spare left to devote to Meteorology. Were it not for the assistance of my wife I should not be able to accomplish any thing.” Despite his recurrent inability to conduct the observations himself, Wilbur prized his status as a Smithsonian observer and the benefits included. His 1861 letter thanked Henry for sending two publications and he admitted that “I feel I am more a receiver than a dispenser of good in the matter [of meteorology] ... I am always glad of the tokens of remembrance which you are pleased from time to time to favor me with.”²⁵⁹

Although her records were repeatedly essential to her absent husband’s valued participation in the meteorological correspondence network, Mrs. Wilbur was never included in the list of observers. Neither her name nor her own views of the project were included in her husband’s letters to the Smithsonian. While the unnamed Merrick women were, according to Thomas Merrick, prepared to undertake the unfamiliar scientific work with pleasure, Mrs. Wilbur’s involvement is characterized, according to her husband, more in the terms of a faithful and dutiful wife. Wilbur’s daughter-in-law’s name and opinions are similarly absent from his writing, although perhaps her seemingly imperfect record keeping indicates less interest or investment in the subject. Regardless of their opinions and motivations, a culture of science permeated the household and enlisted occupants outside of scientific networks in the intellectual activities of the project.

²⁵⁸ Wilbur to the Smithsonian Institution, June 14, 1858, Box 3, SI MP, Smithsonian Institution Archives.

²⁵⁹ Wilbur to Henry, January 19, 1861, Box 6, SI MP, Smithsonian Institution Archives.

Many women's engagement in collecting project data was frequently obscured by their designation as substitutes for men and characterization of their work as the feminine duty of caretakers rather than intellectual contribution. O.W. Morris, a professor at the "Tennessee Institution for the Deaf and Dumb," wrote to the project in 1853 that due to his recent sickness, his daughter made the observations for the recent period.²⁶⁰ Observer John Ingram reported similar difficulties in 1856, "but my wife is competent to take charge of the Register in my absence or sicken[s]s."²⁶¹ In each of these cases, women's data collection was framed as a temporary necessity, part of caring for sick men and enabling them to continue their connection with the project while they recovered.

Seventeen-year-old Frances Elizabeth Willard of Janesville, Wisconsin more extensively assumed this duty on her father's behalf. She wrote to Joseph Henry in December 1856 to inform him that "on account of ill health" her father had gone South for the winter. "I have undertaken to keep the 'Observations' in his absence. I am almost a novice at the business. This is my first attempt at making a report. There are doubtless blunders in it, which, under the circumstances, I hope you will excuse. I will try to do better next time."²⁶² Willard overcame any hesitancy and conducted the observations from the family farm for over four months before her father's return in May 1857. She again kept the meteorological journal in the winter months of 1858 while her father returned south for health reasons.²⁶³

Frances Elizabeth Willard also framed her own involvement as substitutional for her father, but her work was nevertheless essential to consistent data collection. Her absence from

²⁶⁰ Morris to "Mr. Forward," Knoxville, Tennessee, March 18, 1853, Box 2, SI MP, Smithsonian Institution Archives; "Mr. Forward" is assumed to be Edward Foreman.

²⁶¹ Ingram to Henry, Savannah, Ohio, November 11, 1856, Box 5, SMP, Letters received, National Archives.

²⁶² Francis Elizabeth Willard to Henry, December 16, 1856, Box 5, SMP, Letters received, National Archives.

²⁶³ Josiah F. Willard to Henry, May 1, 1857, Box 6, SMP, Letters received, National Archives; Josiah F. Willard to Henry, March 31, 1858, Box 3, SI MP, Smithsonian Institution Archives.

the household resulted in a major disruption of the station's reports to the Smithsonian. In May 1859, Josiah F. Willard wrote that no observations had been made for the year thus far. "My Daughter who has heretofore taken them in my [absence] is away at School + having no other person about me with whom to trust the matter have let it [pause] for this year."²⁶⁴ While her correspondence did not indicate her interest beyond aiding her father, her 1856 letter indicated a desire to learn and improve her data collection abilities. Although she never received recognition in the Smithsonian's *Annual Reports*, her educational opportunities and evident motivation to learn brought her success at the Northwestern Female College in Evanston, Illinois from which she graduated as valedictorian.²⁶⁵

Several women personally attributed their involvement in meteorology to marital duty in their own brief correspondence to the Smithsonian. Mrs. Thompson of Burlington, Vermont wrote in November 1856 that she had been continuing meteorological observations since the death of her husband, Zadok Thompson, about ten months earlier. She explained that "I have tried to persuade someone connected with the university to keep the journal, but they reply, it is too much trouble they cannot undertake it. I have 22 full years of the journal, which has been kept in Burlington by Mr. Thompson and me... I have continued to keep it." She then declared that she only sought to fulfill the wishes of her husband as "he was anxious to have me keep it, until some one else take it, as it had been kept here so long, it ought to be continued."²⁶⁶ Despite

²⁶⁴ Josiah F. Willard to Henry, May 22, 1859, Box 4, SI MP, Smithsonian Institution Archives.

²⁶⁵ Frances Elizabeth Willard pursued a career in teaching and eventually became a professor and dean of the Women's College of Northwestern University. In her later activist work she was appointed the national president of the Women's Christian Temperance Union and the first president of the National Council of Women of the United States. For more on Willard, see her semi-autobiographical sketch, Frances E. Willard and Mary A. Livermore, eds., *A Woman of the Century: Fourteen Hundred-Seventy Biographical Sketches Accompanied by Portraits of Leading American Women in All Walks of Life* (Buffalo: Charles Wells Moulton, 1893), 777-781.

²⁶⁶ Thompson to Charles Mason, Commissioner of Patents, November 6, 1856, Box 5, SMP, Letters received, National Archives.

her entreaty that the record be continued, it is unclear if Thompson continued the work, as neither she nor her husband are listed after 1854.

The widow of another listed observer, Rachel S. Jackson of Darby, Pennsylvania, appealed to Henry for publications in 1857. “Having all of the reports of the Smithsonian Institute in our Library except the last, I am induced to solicit from thee, the continuance of the favor.” She explained that her desire to be reenrolled in receiving materials from the Institution was due to her supporting role in her late husband’s interests. “Though not so ardent in the cause of science as he was, yet having been the companion of his labors therein, it is one of the greatest comforts of my widowhood to continue the pursuit aided by all the advantages I can solicit.”²⁶⁷ While describing herself as a “companion” to her husband’s work, Rachel clearly developed her own interest in science and felt her contribution to and association with her husband’s involvement entitled her to the Smithsonian publications that would enable her own pursuits.

Although each actively collected meteorological data for their household journals, women such as Thompson and Jackson attributed their communication with the Smithsonian to marital loyalty, following the inclinations of their deceased husbands. Their data collection may have been another obligation of marriage to be fulfilled with indifference or small interest, but it must also be considered that these women might have obscured a higher degree of personal scientific interests in the more respectable framework of wifely duty to better justify their claims to the meteorological project and their continued access to Smithsonian resources after their husbands’ deaths.

While relegated to the periphery of scientific networks, the contributions of these women allowed for more consistent and complete data returns to the meteorological project. In fact, men

²⁶⁷ Jackson to Henry, February 7, 1857, Box 6, SI MP, Smithsonian Institution Archives.

occasionally felt the need to account for the absence of women's "substitutional" work to the Smithsonian when observations could not be completed. Along with explaining his own absence from the household due to his work as a surveyor, Princeton, Minnesota observer O.E. Garrison wrote that his record for the past five months was incomplete due to "my wife being also away from home."²⁶⁸ During his subsequent absence for six months in 1859, he reported that his wife remained present and was able to complete the daily observations.²⁶⁹ John Brooks of Princeton, Massachusetts explained his own incomplete record in 1853. "I am sometimes necessarily away from home, and find it impossible to make the observations every day myself, and having no one in my family that is competent, but Mrs. Brooks and her health not allowing the exposure, I do not know that if I should continue them that I would make them any more complete than I have done."²⁷⁰ Albert Carrington of Salt Lake City, Utah similarly questioned his ability to participate in the project without the unpaid assistance of his wife. "I extremely regret that circumstances beyond my control still prevent me sending you my properly filled meteorological blanks... I am called from the city so often, to attend to various duties... neither would it be possible for my wife to [attend the instruments]; I have not yet been able to find a person who will attend without pay."²⁷¹ Carrington recognized the data collection work as valued labor which would require pay outside of the devalued sources of labor within his household.

Some men seeking to join the project even highlighted the abilities of the women in their households to demonstrate their own qualification. In 1856, Amory Holbrook of Oregon City wrote to the Commissioner of Patents requesting he be sent meteorological instruments so that he could join the project and provide full records. He declared that he believed his location to be

²⁶⁸ Garrison to the Smithsonian Institution, July 1858, Box 3, SI MP, Smithsonian Institution Archives.

²⁶⁹ Garrison to the Smithsonian Institution, January 24, 1859, Box 4, SI MP, Smithsonian Institution Archives.

²⁷⁰ Brooks to Lorin Blodget, October 24, 1853, Box 4, SMP, Letters received, National Archives.

²⁷¹ Carrington to Henry, September 13, 1852, Box 1, SI MP, Smithsonian Institution Archives.

“one of the best in the Territory for such observations” and assured the commissioner that his interest would dedicate him to the work. He then boasted that “I am also fortunate in having a Yankee woman for a wife, who in my necessary absence, will be equally anxious with myself to perfect the work.”²⁷² According to Holbrook, his wife was just as eager to conduct scientific observations. He advertised her capabilities as a “Yankee woman” and anticipated her substitutional role as an asset in support of his own qualification for the meteorological project and request for its resources.

In addition to the role of “substitute,” women’s contributions were also diminished or obscured by their designation as “assistants” or helpmates. Observer Peter Reid of Lake Placid, New York wrote to Henry in 1856 requesting a rain gauge and meteorological research materials. Although he expressed that “I feel some confidence I might be able to do justice to [meteorological observations],” he admits “I am assisted by my Daughter (much abler than myself).”²⁷³ According to Peter Reid, his daughter’s particular interest was studying the phenomena of the Aurora Borealis. Through her father’s correspondence with the Smithsonian, she gained household access to meteorological instruments and research materials to pursue her interests. However, despite her acknowledged superior capability she remained an unnamed assistant in the observation work and was never officially listed in the *Annual Reports*.

Professor John Darby’s wife, also appeared to take an active role in collecting data, whether her husband was home or absent. In 1852, John wrote that he arrived home after an absence to find that his wife had proactively submitted the July meteorological journal. However, she never received a new stock of blanks from the Smithsonian and thus could not yet

²⁷² Holbrook to Charles Mason, Commissioner of Patents, March 25, 1856, SI MP, Smithsonian Institution Archives.

²⁷³ A note at the top of Reid’s letter indicates that a rain gauge was sent within the month. Reid to Henry, November 20, 1856, Box 5, SMP, Letters received, National Archives.

send the August data. “Now we are keeping the record on paper ruled for the purpose. Please forward blanks for Aug. & Sept.”²⁷⁴ Although she was relegated to the role of an unnamed helpmate in her husband’s observations and her own interests are indiscernible, John Darby’s description of her active role in his absence and his use of “we” to describe daily work suggests a more continuous collaboration in the project’s regular operations.

Through the limited evidence it is impossible to detect the extent of exactly who was performing what scientific work in the case of the Darby’s and many other contributors to the project. In her article, Sara J. Grossman correctly points out that “it is challenging to discern who wrote for whom, who collected observations, and who simply signed letters. The line between assistant, aide, and collaborator could be blurred.” L.J. Bell of Harper’s Ferry, Virginia describes his station’s work in such collaborative, but blurred terms. After a brief lapse in observations, Bell wrote to Henry in 1861, “please send more blanks ; we have none for late months,- if your confidence in our faithfulness is sufficient.” Bell subsequently describes who else was included in the need for blanks and confidence: “My lady and I are both learning. We have no R. Gauge + the Thermometer we have is a Phil^a minimum self-registering [device].”²⁷⁵ Despite his “lady” going unnamed as a fellow observer, Bell clearly thought about the process of making observations, reading instruments, and learning scientific data collection practice as a shared undertaking with her. However, he does not see her name as necessary to mention to the Smithsonian and only requests publications with reference to his own interests.

In some cases, women were acknowledged as the ones consistently conducting the observations while men were less involved with daily work yet corresponded with the Institution and received credit. According to the Smithsonian’s *Annual Reports* published in 1855, 1856,

²⁷⁴ Darby to Foreman, September 8, 1852, Box 1, SI MP, Smithsonian Institution Archives.

²⁷⁵ Bell to Henry, March 2, 1861, Box 6, SI MP, Smithsonian Institution Archives.

and 1857, observations sent from Putnam County, Virginia were conducted by Samuel Couch.²⁷⁶ In his 1855 letter to the Smithsonian, Samuel Couch reveals that he actually had very little time for the work despite his enthusiasm for the project. “I regret that so much of my time is occupied with other duties that keeping the Meteorological Register is as much as I can spare for the Institute.” Although he was often occupied with other duties, Couch reassured the Institution that the observation register would actually be completed by his wife. “Mrs. Couch has some taste for things of this sort + will fill up the blanks as well as she can.”²⁷⁷ Mr. Couch enjoyed the benefits of corresponding with the Smithsonian, and perhaps shared his access to its resources with his wife. However, like many others, Mrs. Couch’s individual interest and regular contribution to science never received further attention from the Institution and was obscured by her husband’s role as the primary correspondent.

As is evident by E.L. Smith’s clerical employment at the Lawrence, Kansas station, women’s obscured involvement occurred in nonfamilial circumstances outside of household-based stations as well. In a letter accompanying the meteorological returns from Ann Arbor, Michigan, observer Lum Woodruff conveyed a message from his assistant. “Miss Mary H. Clark of this City, my assistant in charge of the observation of periodical phenomena for the Institution made a very full report of her labors some time last spring... She expected an answer, but has heard nothing of their reception. She requests me to make this statement.”²⁷⁸ Although it is unclear if Clark’s report encountered issues in the postal system, was neglected in the disorganization of the Blodget Affair, or was purposefully ignored, the Smithsonian reports

²⁷⁶ Smithsonian Institution, *Ninth Annual Report of the Board of Regents of the Smithsonian Institution Showing the Operations, Expenditures, and Condition of the Institution up to January 1, 1855 and the Proceedings of the Board up to February 24, 1855* (1855), 48 (hereafter cited as SI, *Ninth Annual Report*); SI, *Tenth Annual Report*, 63; SI, *Eleventh Annual Report*, 72.

²⁷⁷ Couch to the Smithsonian Institution, April 4, 1855, Box 2, SI MP, Smithsonian Institution Archives.

²⁷⁸ Woodruff to Blodget, February 11, 1855, Box 2, SI MP, Smithsonian Institution Archives.

never officially acknowledged her as an observer. Clark had seemingly carved out an authoritative role outside of the familial framework of household observations, taking charge of reporting the more qualitative observations of weather phenomena from her station. However, despite her scientific initiative and contribution, her role was described as only assistive to Woodruff. Moreover, her work was ignored by the Smithsonian and she was forced to rely on Woodruff as an intermediary.

As part of her professional duties, a nurse at the United States Marine Hospital in Pittsburgh, Pennsylvania conducted the daily meteorological observations on behalf of the male correspondent credited to her station. In 1858, surgeon Alexander M. Speer reported to Henry that “the observations have been kept very accurately by the nurse in the employ of the Hospital, under my personal direction but on account of the absence of suitable instruments some of the columns have been necessarily disregarded. If we had the necessary instruments it would give us pleasure to add our mite to the general contribution to science.”²⁷⁹ Speer’s statement “under my personal direction” was inserted above the line regarding the nurse’s fundamental role, perhaps as an afterthought to insert his authority. Although she conducted the regular work, Speer’s added phrase recharacterizes the nurse’s role as subordinate. Unlike Miss E.L. Smith of Lawrence, Kansas, the nurse seemingly never wrote to the Smithsonian to describe the contribution she made as part of her employment.

The fragmented accounts of women’s involvement above are not a complete collection of the brief mentions of women’s contributions found in the correspondence, nor are they descriptive enough to offer a tidy or definite narrative of how and why women participated in the Smithsonian Meteorological Project. These short references to their work show that women’s

²⁷⁹ Speer to Henry, April 4, 1858, Box 3, SI MP, Smithsonian Institution Archives.

roles varied according to their circumstances but were often vital to providing consistent observations. The ideological relegation of their labor to the household culturally placed them in a more practically advantageous position to perform data collection work at a fixed location than their husbands who were more often expected to conduct business outside of the home. Cultural pressures simultaneously discouraged them from claiming public recognition of their meteorological work or pursuing independent involvement in scientific networks. Such gendered power structures and cultural norms reduced the perceived value of their data collection work and obscured their involvement in the official record of observers. While close reading offers glimpses into the varied and expansive role women played in the project, it is often difficult to discern the extent of unlisted women's interest or involvement in scientific pursuits in the dominant record. It is also likely, and must be taken into consideration, that more women were performing daily observation work than those briefly acknowledged by male correspondents.

Visibility at the National Level: Women Listed as Official Observers

In 1856, Mrs. J.T. Arnold of Zebulon, Georgia sent eight completed observation tables from her station to the Commissioner of Patents for use in the meteorological project. She also submitted requests for resources to aid in her meteorological endeavors and personal interests. "I regret exceedingly the want of a complete set of Instruments. If the Rain Gauge is not to be furnished gratuitously, please notify me of the price at which it would be furnished. Also the price of all the Instruments. I would be pleased to receive seeds to distribute among my agricultural friends."²⁸⁰ Beneath Arnold's message, another note is written by the recipient of her

²⁸⁰ Arnold to Charles Mason, 1856, Box 5, SMP, Letters received, National Archives; observers with agricultural interests frequently requested seeds which were provided through the Smithsonian's connections with the Patent Office and its seed distribution program. For more on this function of the Patent Office, see R.J. Griesbach and Alex Camarota, "Putting Down Roots at the Patent Office," *Inventor's Eye*. United States Patent and Trademark Office, November 2016.

letter, “Mrs. Arnold’s name is not on the new list of observers—I shall reinstate it and send her a supply of Blanks and some seeds.” While some women’s identities were overlooked, Mrs. J.T. Arnold was added into the following year’s official list of observers.²⁸¹ Although it is possible another party introduced Arnold, she seemingly gained official recognition by corresponding and providing data independent of a direct male intermediary. However, she retained her title of “Mrs.” in her signature to denote her cultural status and due respect as a married woman.²⁸²

Some women, like Arnold, carefully navigated gendered expectations to receive national recognition for their contribution to the Smithsonian Meteorological Project within acceptable mainstream cultural boundaries. While it is difficult to identify an immutable pattern that resulted in their inclusion in the official observer lists, generally these women’s circumstances and methods more often allowed them to interact directly with the Institution as the sole correspondent for their station or correspond with a frequency which made them more difficult to overlook.

Octavia C. Walker of Cooper, Michigan gained recognition for her own meteorological contributions from 1854 to 1858 and 1860 to 1862 while invoking her identity as a married woman and her husband’s sanction of her work. Walker regularly corresponded with the Smithsonian and submitted her own returns. Although she signed her letters as “Octavia C. Walker,” she was officially listed as “Walker, Mrs. Octavia C.”²⁸³ Like other observers, she made claims upon Smithsonian resources, especially seeking Smithsonian publications and

²⁸¹ SI, *Twelfth Annual Report*, 68.

²⁸² Arnold to Charles Mason, 1856, Box 5, SMP, Letters received, National Archives.

²⁸³ Walker is listed as “Walker, Miss Octavia C.” in the Smithsonian’s *Tenth Annual Report*, but this appears to be a mistake which is corrected in the subsequent lists; Smithsonian Institution, *Tenth Annual Report of the Board of Regents of the Smithsonian Institution Showing the Operations, Expenditures of the Institution, and Conditions of the Institution Up to January 1, 1856* (1856), 65 (hereafter cited as SI, *Tenth Annual Report*); For an example of her corrected title, see SI, *Eleventh Annual Report*, 75.

meteorological materials.²⁸⁴ Her connection with the Smithsonian also served her husband's interests. In 1856 she requested the Smithsonian's "Drawing of Clouds," to assist in her observations. Additionally, "Mr. Walker says he would deem it a special favor if you would send a copy of the Coast Survey [Report]."²⁸⁵ In discussing her husband's requests (and tacit approval) alongside her own, Octavia Walker carefully navigated cultural expectations of women while performing her own scientific work and gaining recognition for her contribution at the national level.

Sara S. Thomas of Carbon Cliff, Illinois similarly pursued her own interest in meteorological observation through her correspondence with the Institution. Seeking to improve her work she wrote to Henry in May 1859, "I shall be exceedingly obliged for any suggestions you may make for my improvement." While she kept the record and wrote to the Institution directly, she ended her letter citing her husband's explicit authorization of her involvement in the network. "Mr. Thomas wishes me to add his regard + allow me to subscribe myself."²⁸⁶ While her role was acknowledged in the official observer list, her own name, like Eliza Young's, was subsumed by her husband's and registered as "Thomas, Mrs. Wm. S."²⁸⁷ Even when operating as the sole correspondent from their location, women's visibility could be obscured by male family members.

After men in their family first initiated involvement with the project, some women utilized their less visible assistive roles and household scientific work to eventually gain greater access to the meteorological correspondence network. Professor William Baer of Sykesville

²⁸⁴ Walker wrote to Henry in August 1856 requesting all of the Smithsonian Annual Reports that could be distributed; Walker to Henry, August 18, 1856, Box 5, SMP, Letters received, National Archives.

²⁸⁵ Walker to Henry, March 3, 1856, Box 2, SI MP, Smithsonian Institution Archives.

²⁸⁶ Thomas to Henry, May 3, 1859, Box 4, SI MP, Smithsonian Institution Archives.

²⁸⁷ SI, *Twenty-Third Annual Report*, 82.

Maryland began observations for the Smithsonian in its first year, 1849.²⁸⁸ Based on the evidence of unacknowledged involvement within many households, it is likely that his daughter, Harriott M. Baer conducted the observation work with him in these years. By 1853, Harriott started actively corresponding with the Smithsonian herself when submitting their station's monthly returns, and her name first appeared alongside her father's in the *Annual Report* published in 1854.²⁸⁹ Within two years, Harriott was credited as the sole correspondent for her household's station, according to the *Annual Reports*, although her father occasionally sent letters himself.²⁹⁰ While several of her earlier letters are written on behalf of her father, much of her correspondence throughout the project resembles that of her male counterparts as she regularly requested blanks, reported her methodology, and made demands upon the Smithsonian for publications and other resources.²⁹¹ She may have had to rely on her father's involvement as an entry point to the project, however, Harriott slowly increased her work's visibility and carved out space for herself in the extended scientific community.

Like Harriott Baer, Helen Whelpley took over as her station's solely listed meteorological correspondent from her father. Thomas Whelpley appeared on the official lists from 1848 to 1854, however, his name was replaced by nineteen-year-old Helen for their

²⁸⁸ SI, *Fourth Annual Report*, 29.

²⁸⁹ An example of early correspondence from Harriott includes Harriott Baer to the Smithsonian Institution, February 1, 1853, Box 1, SI MP, Smithsonian Institution Archives; *Eighth Annual Report of the Board of Regents of the Smithsonian Institution Showing the Operations, Expenditures and Condition of the Institution Up to January 1, 1854* (1854), 59 (hereafter cited as SI, *Eighth Annual Report*).

²⁹⁰ SI, *Tenth Annual Report*, 63; For an example of William Baer's continued correspondence includes a letter describing his methodology of observing cloud movement in 1858, see William Baer to Henry, June 1, 1858, Box 3, SI MP, Smithsonian Institution Archives.

²⁹¹ An example of Harriott writing for her father includes a letter signed "Harriott M Baer for Dr. Wm. Baer." This letter does not have a year indicated, however it is included alongside a box of correspondence from the years 1851-1853, see Harriott Baer to the Smithsonian Institution, March 31, Box 3, SMP, Letters received, National Archives; For an example of Harriott requesting blanks see Harriott Baer to Henry, February 10, 1858, Box 3, SI MP, Smithsonian Institution Archives; Harriott wrote to the project describing her method of observing cloud movement in 1859, see Harriott Baer to the Smithsonian Institution, April 7, 1859, Box 7, SMP, Letters received, National Archives; Harriott wrote several times to request Smithsonian resources, including her 1857 request for the most recent Smithsonian Annual Report, see Harriott Baer to the Smithsonian Institution, October 1, 1857, Box 6, SMP, Letters received, National Archives.

family's station in 1855.²⁹² During the six years Helen served as the station's primary correspondent she utilized the network to make demands for resources.²⁹³ She also communicated logistical issues with daily data collection, similar to many male observers. This included explaining to the Smithsonian that her irregular and missing observations for the summer of 1860 were due to her "being absent from place of observation, a large portion of the year and being unable to obtain a competent person who could faithfully attend to the reports."²⁹⁴ The following year, Helen's younger sister, Florence, was apparently available, competent, and enthusiastic enough to conduct the observations and take over as the station's primary correspondent until 1871.²⁹⁵ While a male family member initiated the exchanges with the Smithsonian and their earlier contributions were likely obscured, Baer and the Whelpley sisters used this more acceptable entry point to grow their interests in meteorological observations, take on active correspondence roles for their households, make their own demands upon the Smithsonian, and gain full-fledged recognition by the Institution and national readers of the *Annual Reports*.

Although women negotiated more visible roles the exact contributions and functions of multiple household members at observation stations are blurred and ambiguous in the correspondence. Even when women were credited, other household members still might conduct

²⁹² Helen's age and the Whelpley family are recorded in the 1850 United States census record for the Frenchtown Township, Monroe, Michigan, see United States Census Office, "Schedule I.—Free Inhabitants in Township of Frenchtown in the County of Monroe State of Michigan," September 11, 1850, *The Seventh Census of the United States, 1850*, Microfilm Publication M432, National Archives and Records Administration, Washington, DC, database with images, *FamilySearch*; For a summary of who served as the primary correspondent from the Whelpley family's stations in which years, see SI, *Twenty-Eighth Annual Report*, 103.

²⁹³ In 1857, Helen requested a new glass tube for her rain gauge from the Smithsonian. It is noted by the letter's recipient that her new tube was sent about two weeks after she made the request; Helen Whelpley to Joseph Holt, Commissioner of Patents, December 29, 1857, Box 3, SI MP, Smithsonian Institution Archives.

²⁹⁴ Helen Whelpley to Henry, November 13, 1860, Box 6, SMP, Letters received, National Archives.

²⁹⁵ In 1861, Florence wrote that she was "engaged to supply [Helen's] place;" Florence Whelpley to Henry, June 6, 1861, Box 8, SMP, Letters received, National Archives; After Florence served as the primary correspondent until 1871, Thomas Whelpley resumed the role for their station for the remainder of the project; SI, *Twenty-Eighth Annual Report*, 103.

some of the observations or correspondence, as seen with William Baer writing to the Smithsonian regarding the project in years when Harriott was solely listed, or in the Whelpleys switching primary correspondent and observer credits multiple times. Anna Landon of Eden, New York demonstrated just how essential the entire household could be to conducting regular observations. In April 1858 she reported to the project that “we regret to state that our observations for the months of Jan. to Feb. /57 are not sufficiently accurate for your use owing to the sickness of the entire family.”²⁹⁶ Stephen Landon was listed as the station’s observer in 1855 while Anna became the solely credited observer from 1857 through 1859.²⁹⁷ Despite the lists only giving one name at a time for her station while several other station’s, such as the Baer’s, might list multiple observers, Landon’s use of “we” and attribution of the inaccurate observations to the entire family’s unfortunate unavailability indicates the observations were a group undertaking. However, such correspondence does not reveal in what capacity the family divided the scientific work and who else may have been involved.

Similar to Harriott Baer and the Whelpley sisters, Ellen Kownslar of Berryville, Virginia made observations alongside her father. Although Ellen was the only observer listed in the *Annual Report* for her station from 1855 to 1857, her correspondence makes her father’s involvement during these years explicit.²⁹⁸ In 1856, she wrote to the Commissioner of Patents, “My Father is anxious to purchase a set of instruments for the “Meteorological Observations” and thinking you were in this habit of selecting them, would ask as an especial favor, that you would get them for him + send them by mail with a bill.”²⁹⁹ While listed as the official observer, Ellen’s own interest and role in the project was obscured by her invoking her father in the

²⁹⁶ Landon to the Smithsonian Institution, April 3, 1858, Box 3, SI MP, Smithsonian Institution Archives.

²⁹⁷ SI, *Twenty-Third Annual Report*, 93.

²⁹⁸ SI, *Twenty-Third Annual Report*, 84.

²⁹⁹ Kownslar to Charles Mason, August 16, 1856, Box 5, SMP, Letters received, National Archives.

request for instruments. Was Ellen acting in a secretarial role for her father, charged with sending the reports each month, or was she an active observer who felt she needed to use her father's name to facilitate the purchase of instruments for their household's station? Despite her national visibility, the exact operations of her household's scientific work and the extent of Ellen's interest in meteorology remain undefined.

There are instances where the role women played in the meteorological project is more clearly discernable from the archival record. Mary A. Goff was designated as her station's sole observer in a reversal of dominant gendered patterns of visibility. Both Mary and her husband William corresponded with the Smithsonian during the one year they conducted observations. In his March 1856 letter to Henry, William Goff acknowledged his wife's work, "The observations above mentioned were taken by my wife with the idea that they would be of some benefit to your Institution." However, William details the conditions of their station with interest and includes himself in contributing to future work, "If you desire me to contribute monthly Tables and will furnish me with the required blanks I will do so together with any other information I can give with great pleasure."³⁰⁰ Mary's own letter sent in May demonstrate that she continued to act as the principal observer with small contribution from her husband. "Enclosed are the tables for the last two months, your blanks have not arrived as yet. As soon as I receive them observations will be taken of wind and rain as soon as Mr. Goff returns from the East he will make a rain gauge."³⁰¹ Despite his direct correspondence and small contribution, Mary Goff's visible, primary role was seemingly favored exclusively over William's, although her married status is acknowledged in her listing as "Goff, Mrs. M.A." in the *Annual Report* published in 1857.³⁰²

³⁰⁰ William Goff to Henry, March 24, 1856, Box 2, SI MP, Smithsonian Institution Archives.

³⁰¹ Mary Goff to Henry, May 18, 1856, Box 2, SI MP, Smithsonian Institution Archives.

³⁰² SI, *Eleventh Annual Report*, 75.

The Goff's representation in the observer lists disrupted patterns of men who actively corresponded or contributed to the project receiving initial credit or sharing credit with the women at their station. Throughout the project, observer visibility and recognition in published lists were not granted by the Institution through any abiding or uniform rules of gender, active correspondence, or data collection work.

Close reading of the correspondence further expands our understanding of who was participating in the project work within households, even for those individuals named in the official lists. While wives and older daughters were recruited into the scientific household work, so too were young children. J.R. Hoffer described his daughter, Mary E. Hoffer's role and interest in the project work. In 1857 he wrote to Henry,

I enclose you one of the Meteorological tables, containing some observations made by my little daughter. She has not paid strict attention to the time of observing the Thermometer. She always was near the time I marked at the top. For April she is more punctual. She is but 10 years old, but she is very punctual and takes much interest in the matter. I promised her a hygrometer and rain gauge when I get to Phila., in a few weeks, which will add materially to the value of her observations. You sent 3 blank tables: she keeps one for each month, so she will have none left to send you for April. Please send some more.³⁰³

Hoffer was clearly proud of his daughter's work and expected her to learn and progress in her ability to send accurate, complete records. Evidently, the inclusion of Mary's name in the 1857 list of Smithsonian observers was a source of pride, confidence, and encouragement for Mary herself. When sending the meteorological reports for October and November 1858, J.R. Hoffer reported that Mary had taken on a greater role:

These are the first copies made by my little daughter whose name stands on the list of Reporters in the Smithsonian Institution Report for 1857. When she is more competent these reports will be made fuller, for now I only made such observations as she can continue during my absence— my business calling me frequently from home. When I

³⁰³ Hoffer to Henry, April 22, 1857, Box 6, SMP, Letters received, National Archives.

gave you her name as reporter she considered her penmanship too poor to make the reports, and I continued them on my name, but on finding her name in the list she took courage.”³⁰⁴

J.R. Hoffer simultaneously encouraged his young daughter’s meteorological interest while relying on her substitutional role in his absence from home. Through the scientific activities of her household, Mary learned to conduct the same observations and, meaningfully, received similar national credit as men of science across the country.

Mary was not the only young girl to receive official recognition for her meteorological contribution, either. Ten-year-old Celestia Wattles also conducted observations for her household station in Moneka, Kansas. According to her father, J.O. Wattles, during his absence in the summer of 1859, Celestia filled the blanks under the supervision of an unnamed family member and “[took] much pleasure in the work.” J.O. Wattles framed the meteorological project as a tool in Celestia’s spiritual, rather than scientific, education. “I hope by encouraging my daughter in her early life to observe the manifestation of great nature to teach her in mature age to great nature’s greater god.”³⁰⁵ It is unclear why both Celestia and Mary were included in the official list of observers alongside their fathers’ names while some female family members named by other male observers went unacknowledged. However, their visibility further extends an understanding of the pervasiveness of project work and the influence it could have on the lives of all individuals within the household.³⁰⁶

Enslaved Labor and the Antebellum Smithsonian Meteorological Project

³⁰⁴ Hoffer to Joseph Holt, Commissioner of Patents, December 27, 1858, Box 4, SI MP, Smithsonian Institution Archives.

³⁰⁵ Wattles to the Smithsonian, August 24, 1859, Box 4, SI MP, Smithsonian Institution Archives.

³⁰⁶ Age is also difficult to detect in both the correspondence and official observers lists without further comparison with census records or other evidence.

Examining the frequent reliance on less visible forms of labor to perform extensive data collection throughout the Smithsonian Meteorological Project prompts consideration of how the project may have operated in southern states and the direct and indirect roles of enslaved people. Slaveholders can easily be identified in the official lists of observers through comparing their names and station locations with the Slave Schedule data collected for the 1850 and 1860 United States census. Through the theft of enslaved African American labor, slaveholding observers, both white men and women, undoubtedly obtained leisure time to pursue scientific inquiry and maintain their relationship with the Smithsonian. Eliza Young, the first woman included in the Smithsonian's observer list published in 1849, was noted as giving her "untiring attention" to her observations. However, her time and attention dedicated to the project derived from the coerced labor of others as her household and the 800 acres of farmland listed in her husband, Lawrence Young's name were maintained by the appropriated labor of about forty African American individuals enslaved by the Youngs.³⁰⁷ While some white women's scientific work went officially unrecognized, an entirely different system of hegemony, coercion, and unacknowledged labor permeated the functions of such Southern household stations.³⁰⁸

³⁰⁷ United States Census Office, "Schedule 4. —Productions of Agriculture in Frenchtown in District Number one in the County of Jefferson State of Kentucky," August 17, 1850, *The Seventh Census of the United States, 1850*, Microfilm Publication M1528, National Archives and Records Administration, Washington, DC, database with images, *FamilySearch*; United States Census Office, "Schedule I. —Free Inhabitants in District No one in the County of Jefferson State of Kentucky," August 21, 1850, *The Seventh Census of the United States, 1850*, Microfilm Publication M432, National Archives and Records Administration, Washington, DC, database with images, *FamilySearch*; United States Census Office, "Schedule 2. —Slave Inhabitants in District No one in the County of Jefferson State of Kentucky," August 20, 1850, *The Seventh Census of the United States, 1850*, Roll 225, Microfilm Publication M432, National Archives and Records Administration, Washington, DC, database with images, *FamilySearch*.

³⁰⁸ Historian Thavolia Glymph notably emphasizes that historians must shift perspective from male authority over women in general to recognize white women's active participation in slavery and the power it granted. Glymph additionally deconstructs the ideology of public/private spheres and the cult of domesticity to demonstrate that the households of slaveholders were not exclusively private. Rather they must be seen as hybrid workplaces where white women enacted power and violence on non-family members who performed domestic labor in white familial spaces; Thavolia Glymph, *Out of the House of Bondage: The Transformation of the Plantation Household* (Cambridge, NY: Cambridge University Press, 2008).

From close reading of the Smithsonian meteorological correspondence, it is evident that the demands of project data-gathering from a fixed location often relied on multiple individuals in a household to consistently collect meteorological data several times a day. Based on this functionality in many household meteorological stations, it must be considered that the fixed labor of enslaved African Americans might have also been used to conduct observations in the absence of white observers. For example, an 1852 letter from observer Richard T. Gibson indicates that an enslaved individual played a direct role in data collection at the Whitemarsh Island plantation station in Georgia. Using a thermometer, Gibson started submitting observations for the Smithsonian from the beginning of the meteorological project in 1849.³⁰⁹ In 1852, the Institution offered Gibson additional instruments to make “more extended observations of the weather.” Gibson explained in his letter to project assistant Edward Foreman that “I should be glad to make myself useful in some way certainly, but I doubt if I could keep an accurate and continued Register, when several instruments are to be looked to; in as much as I am frequently absent, and unhappily, I am still alone, or as the Scripture hath it, I sit and am alone as a sparrow upon the housetop.” He further elucidated his current management of observations with a single instrument. “A Thermometer I manage with sufficient accuracy by the aid of an intelligent servant.”³¹⁰

Due to his single status and lacking children or other relations in his household to take on the role of “substitute” or “assistant,” the labor of “an intelligent servant” was essential to Gibson’s ability to provide complete and accurate data at Whitemarsh Island to the Smithsonian Institution. Examination of the 1850 United States census records show no indication of a white

³⁰⁹ For Gibson’s first appearance in the observer list, see SI, *Fourth Annual Report*, 29.

³¹⁰ Gibson to Foreman, November 1, 1852, Box 1, SI MP, Smithsonian Institution Archives.

servant in Gibson's household.³¹¹ However, the 1850 Slave Schedule does list seventeen unnamed individuals enslaved by Gibson, one of whom seemingly "aided" in the scientific work of the meteorological project at the plantation station.³¹²

With the exception of this brief and ambiguous reference by Gibson, any direct involvement of enslaved individuals in conducting the observations and collecting project data is silenced in the antebellum project record. Anti-literacy laws of the South likely limited the circumstances suggested on Whitemarsh Island at other Southern observation stations. Georgia itself had strict anti-literacy laws that prohibited and punished the teaching of any black person, enslaved or free, to read and write.³¹³ However, such laws did not exist in every slave state nor were they consistently or uniformly enforced in those to which they applied. Additionally, as American and Africana Studies scholar Heather Andrea Williams documents, "despite laws and custom in slave states prohibiting enslaved people from learning to read and write, a small percentage managed, through ingenuity and will, to acquire a degree of literacy in the antebellum period."³¹⁴

³¹¹ The only other person listed in Gibson's household was a woman, aged sixty, named "Mary A. Cooper" whose "Value of Real Estate owned" was higher than Gibson's by \$1,000. Cooper enslaved ten people in 1850 and her name appears below Gibson in the 1850 Slave Schedule. The relationship between Cooper and the forty-one year old Gibson is unclear; For Gibson and Cooper residing in the same household, see United States Census Office, "Schedule I. —Free Inhabitants in District No 13 in the County of Chatham State of Georgia," November 15, 1850, *The Seventh Census of the United States, 1850*, Microfilm Publication M432, National Archives and Records Administration, Washington, DC, database with images, *FamilySearch*; For Mary Cooper's name in the 1850 Slave Schedule, see United States Census Office, "Schedule 2. —Slave Inhabitants in District No 13 in the County of Chatham State of Georgia," November 16, 1850, *The Seventh Census of the United States, 1850*, Roll 89, Microfilm Publication M432, National Archives and Records Administration, Washington, DC, database with images, *FamilySearch*.

³¹² United States Census Office, "Schedule 2. —Slave Inhabitants in District No 13 in the County of Chatham State of Georgia," November 16, 1850, *The Seventh Census of the United States, 1850*, Roll 89, Microfilm Publication M432, National Archives and Records Administration, Washington, DC, database with images, *FamilySearch*.

³¹³ Kim Tolley, "Slavery," in *Miseducation: A History of Ignorance-Making in America and Abroad*, ed. A.J. Angulo (Baltimore, MD: John Hopkins University Press, 2016), 13-16.

³¹⁴ Heather Andrea Williams, *Self-Taught: African American Education in Slavery and Freedom* (Chapel Hill: The University of North Carolina Press, 2009), 7.

It is impossible to do more than speculate about the roles of enslaved individuals from the limited evidence of the dominant narrative preserved in the Smithsonian meteorological correspondence records. In addition to any punitive threat of anti-literacy laws which discouraged the acknowledgment of their involvement, white hegemonic systems generally resulted in the obscuring of enslaved identities throughout much of the written record. The records utilized here veil the extent to which enslaved individuals conducted data collection work on the periphery of American science. Nor do these records consider frameworks of knowledge outside of the dominant, white, patriarchal system of scientific understanding. It must be considered that generations of outdoor work and local environmental familiarity produced alternative ways of understanding meteorological phenomena and theories of weather patterns in enslaved communities.³¹⁵ Although the individual designated in Gibson's letter was an observer, this record cannot be used to understand such aspects of their meteorological experience outside of their coerced contribution to American science.

While the enormous silence in these archival records does not illuminate the feelings the individual at Whitemarsh Island held about their role as data collector or the thoughts they may have had in examining the weather, it also does not provide any identifying information or personal element of their life—important context for understanding their perspective outside of their work mandated by Gibson. Mary N. Elliott, Curator at the Smithsonian National Museum of African American History and Culture emphasizes that “enslaved black people [were] not just

³¹⁵ Foucault discusses the relationship between power and knowledge and states that “the exercise of power perpetually creates knowledge and, conversely, knowledge constantly induces effects of power.” He identifies forms of knowledge created outside of dominant structures, or “subjugated knowledges” dismissed by empowered frameworks of knowledge. Such subjugated knowledges include a “whole set of knowledges that have been disqualified as inadequate to their task or insufficiently elaborated: naive knowledges, located low down on the hierarchy, beneath the required level of cognition or scientificity.” Michel Foucault, *Power/Knowledge: Selected Interviews and Other Writings, 1972-1977*, ed. Colin Gordon, trans. Colin Gordon et al. (New York: The Harvester press, 1980), 52, 82.

their work.” In her and the Institution’s work to research and memorialize enslaved and free black individuals who were part of the construction of the Smithsonian’s first building on the mall, she explains that, beyond just their labor, “we want to find out about the lived experiences of African Americans who helped to build the foundation of what we know as the Smithsonian... What were the values of those people? What were things that meant so much to them?”³¹⁶ As is the case with the meteorological contributor on Whitemarsh Island, Elliott notes the difficulty of identifying enslaved individuals who contributed to the early Smithsonian mission. As she points out, further work is necessary to add layers to our understanding of their experience beyond just brief mention of their labor.³¹⁷

Conclusion

On the morning of April 2, 1852, Susan S. Oakley of Jackson, Mississippi wrote to her representative in Congress, John D. Freeman, with a request.

My present passion is Geology and Minerology—it has continued for some years and grows with what it feeds upon. The members I believe have access to the offices where minerals + fossils are deposited and duplicates when they have them are given away—can you aid me in procuring some for my Cabinet?—either send or bring me some? Perhaps you can open for me a correspondence or suggest some one with whom might make exchanges. The Smithsonian Institute makes such exchanges as they have large collections and I would be much obliged to you if you would aid me in the matter.

Through the intervention of her congressional representative, Oakley sought to procure resources which would aid her pursuit of knowledge in geological and mineral science. In addition to pointing out Freeman’s obligation to his constituents, she justified her expectation that the Smithsonian provide her resources. “We have kept the Meteorological Register for some years

³¹⁶ Mary N. Elliott, “Foundational History: Black Laborers Building the Smithsonian,” *Building Washington's Landmarks: Enslaved and Free Black Labor and the Making of the Capital* (lecture, Smithsonian National Museum of American History, Washington, DC, April 29, 2022).

³¹⁷ If such individuals can be identified, Elliott strongly advocates for reaching out to their descendants to obtain stories that have been handed down through generations and communities; Elliott, “Foundational History.”

for that Institute and we are not unknown to Prof. Henry. They have at the Institute minerals from the survey about the Lakes and Northwestern states which I would be glad to get.”³¹⁸ Susan Oakley’s use of “we” demonstrates that multiple people at her station took part in the Smithsonian Meteorological Project. While her father, Thomas Oakley, was the only observer from Jackson officially recognized in the Smithsonian’s *Annual Reports* from 1849-1852, additional individuals performed the daily data collection, wrote correspondence, and made demands upon the Institution at that location.³¹⁹

The involvement of uncredited contributors at the periphery of American extended scientific communities was essential to the consistent and more complete data collection demanded by the large-scale Smithsonian Meteorological Project. White women particularly were often relied upon to perform project data labor as cultural norms idealistically fixed their work within the “private” household and designated the “public sphere” as the site of male work. Even if their own levels of scientific interests varied, it is easy to imagine the daily work of data collection as becoming another household chore for women connected with the project. However, while they may have been more practically positioned to perform the project’s duties, gender norms simultaneously discouraged women from visibly pursuing science for the sake of their own interest. Despite collecting data for years, the identity of Susan Oakley and many others were absent from the published observer lists, and despite her openly expressing her scientific interests in her letter, Oakley made it very clear that her inquiries were not purely to satisfy her personal curiosity. Rather she framed her request as being “for the advancement of knowledge rather than my own individual interest.”³¹⁸ The participation of these women was often obscured—their involvement downplayed and mentioned only in passing. Their roles in

³¹⁸ Oakley to Freeman, April 2, 1852, Box 3, SMP, Letters received, National Archives.

³¹⁹ SI, *Twenty-Third Annual Report*, 76.

data collection, data reduction, submission of reports, and institutional correspondence likely varied and, while some women were more visibly involved in the project, no systematic pattern or tidy narrative exists in determining which women's work was officially recognized in the observer lists.

It is highly likely that more individuals than those officially listed and those briefly described in the project correspondence performed data labor for the Smithsonian Meteorological Project. As evident from existing archival records science work could envelop entire households in the daily functionality of large-scale data work. Furthermore, evidence from Whitemarsh Island suggests such patterns in the South incorporated appropriation of enslaved labor to meet the demands of daily data collection. Identifying the individuals who collected project data while relegated to the periphery of American science expands our knowledge of those excluded from recognition as sources of legitimate knowledge. Such examination helps us identify broader contributions to the field of science while specifically adding a new dimension to understanding the Smithsonian Meteorological Project and its impact on shifting the focus of the Institution from ambitions of purely abstract science conducted by elites to a publicly oriented information institution.

While women's involvement in the Smithsonian Meteorological Project may have presented many women of science with the opportunity to gain access (often through male intermediaries) to resources for pursuing their interests, their contribution was devalued in its lack of official recognition, their characterization as substitutes, assistants, or helpmates, and the unpaid nature of the volunteer project work itself. In his collective biography of Smithsonian observers, historian of science, Ian Rodger Fleming, notes that,

Initially the Smithsonian meteorological project attracted a rather eminent group of observers. Almost half of the 1851 sample (47 percent) were engaged in scientific,

technical or educational occupations; 28 percent appeared in the standard biographical dictionaries; 14 percent were listed as authors in the Royal Society Catalog of Scientific Papers; and 15 percent were [American Association for the Advancement of Science] members. By 1860, these percentages had decreased to 23, 17, 7, and 4.³²⁰

Fleming attributes the declined involvement of more professional, elite men of science to several factors. “Certainly, the Smithsonian meteorological project attracted greater attention within the scientific community during its formative, experimental years when a solution to the storm problem was actively being sought.” Additionally, he observes that the relationship between the Smithsonian and the agriculturally interested Patent Office changed the project demography and increased the involvement of farmers. Finally, he posits that the development of the professionalized field of science gradually altered elite men’s perceived value of involvement with unpaid data collection work throughout the course of the Smithsonian Meteorological Project.³²¹

The developing infrastructure of American science also played a major role in the decreasing status indicators. Observer-professors active in 1851 were replaced at their institutions by individuals who typically had more formal education, more professional opportunities for research and publication and their specialties, and less time to spend as passive and poorly rewarded weather observers.³²¹

While the contributions of elite men of science receded, women were more visibly relied upon to complete the data collection work of the meteorological project. More women were listed as official observers in the second half of the 1850’s than the first and uncredited women in the correspondence appeared to increase as well.³²² This is likely tied to the occupational shift in observer demography toward men whose occupations provided less leisure time for their personal scientific pursuits and more extensively relied on women in their households to perform

³²⁰ Fleming, *Meteorology in America*, 92.

³²¹ Fleming, *Meteorology in America*, 93.

³²² For women’s names and the dates of their involvement in the observer lists, see SI, *Twenty-Third Annual Report*, 68-101; For mention of uncredited women in observer letters, see meteorological correspondence records: SI MP, Smithsonian Institution Archives and SMP, Letters received, National Archives.

the data collection work. Additionally, Joseph Henry and the Smithsonian Institution perhaps were more permissive of women's contribution in the effort to rebuild the program in the wake of the 1853-1854 Blodget Affair's disastrous impact on the observer network. However, as women navigated gendered expectations and carved out space for themselves as data collectors in this national scientific project, the role of data collector and its importance in the production of scientific knowledge was increasingly devalued in nascent, more elite, professional frameworks of American science.

The devaluation of roles which women took on and were expected to fulfill in the large-scale volunteer public science work of the Smithsonian Meteorological Project continued in the emerging professional labor market for female scientists at the end of the century. Historian of science and gender, Margaret W. Rossiter, describes increased opportunities for women's higher scientific education by the 1870's and 1880's. Many of these women sought to apply their degrees outside of the household and entered the expanding labor market of professional science created by factors such as the advance of "big science."³²³ Large-scale professional scientific projects increasingly required "large budgets that could support staffs of assistants at a few research centers." As to not threaten men's opportunities and dominance within scientific fields, male scientists created assistive jobs for women which relegated them to more "feminine" positions "that were so low-paying or low-ranking that competent men would not take them, which often required great docility or painstaking attention to detail..."³²⁴ Such women's work often involved data collection, computing, and copying, as Rossiter observes in her examination of female astronomers. "Because they were not promoted to other more administrative or managerial duties, as happened to the more talented men, the female assistants were forced (or

³²³ Margaret W. Rossiter, "'Women's Work' in Science, 1880-1910," in *History of Women in the Sciences: Readings from Isis* (Chicago, IL: University of Chicago Press, 1999), 288.

³²⁴ Rossiter, "'Women's Work' in Science," 289.

expected) to make a whole career out of a job that should have been just a stepping stone to more challenging and prestigious roles.”³²⁵ Like the women of the Smithsonian Meteorological Project, women pursued and attained opportunities for scientific practice, however, their roles were diminished and often offered little recognition, their movement and advancement within the field severely limited by gender barriers. “Thus a segregated, low-status, almost invisible kind of “women's work” offered a harmonious way to incorporate the newcomers into the scientific labor force in ways that divided the ever-expanding labor, but withheld the ever more precious recognition.”³²⁶ The framework which emerged in the Smithsonian’s early “big science” project was cemented in the professional field of science at the end of the century and set a pattern which persisted for twentieth century women in science.³²⁷

³²⁵ Rossiter, ““Women's Work’ in Science,” 292.

³²⁶ Rossiter, ““Women's Work’ in Science,” 304.

³²⁷ Rossiter, ““Women's Work’ in Science,” 304; For more on women’s relegation to devalued data collection and computation roles in twentieth century American science, see Rossiter, *Women Scientists in America* and Jennifer S. Light, “When Computers Were Women,” *Technology and Culture* 40, no. 3 (July 1999): pp. 455-483.

Conclusion

By its persevering efforts to carry out the will of the founder, [the Smithsonian Institution] has succeeded in rendering familiar to the public mind and the United States the three fundamental distinctions in regard to knowledge, which must have an important bearing on the future advance of science in this country: namely, the *increase* of knowledge, the *diffusion* of knowledge, and the practical *application* of knowledge. ... In our country, however, they have not all met with an equal share of attention... The fact, however, does not appear to have been so constantly before the public mind that the advance of science or the discovery of new truths, irrespective of their immediate application, is also a matter of great importance, and eminently worthy of patronage and support. The progress of society and the increase of the comfort and happiness of the human family depend as the basis on the degree of our knowledge of the laws by which Divine Wisdom conducts the affairs of the universe.³²⁸

In his report for the year 1859, the Smithsonian Institution's first Secretary, Joseph Henry, once again attempted to convince Congress and the American public that the Smithsonian's purpose was to advance specialized, abstract science, regardless of its immediate utility to the public. Henry's constant advocacy for this vision in the Smithsonian's early *Annual Reports* was an effort to counter public expectations and accentuates a tension in mid-nineteenth-century American science. Republican ideology was embedded in late eighteenth and early nineteenth-century frameworks of science in the United States, and amidst the early nineteenth-century American middle-class culture of self-improvement by education, there was a belief by the public that legitimate scientific enterprises would directly meet popular intellectual needs and serve utilitarian purposes. However, by the 1850's some elite men of science, such as Joseph Henry, sought to reorganize American science according to a more hierarchical, professional model akin to structures in western Europe. This included implementing standards of practice whereby scientific work was verified and legitimated within a rigorous scientific community, rather than determined by the public. Legitimate scientific enterprise would be limited within this

³²⁸ Smithsonian Institution, *Annual Report of the Board of Regents of the Smithsonian Institution, Showing the Operations, Expenditures, and Condition of the Institution for the Year 1859*, (1860), 13-14.

community which could conduct more theoretical and abstract inquiry without influence from or regard for the scientifically interested public's demand for practical work. This effort to separate American scientific practice from the direct interest of the public contradicted existing popular expectations. During the Smithsonian's early years, Henry sought to advance his vision for American science by establishing a professional research institution separate from popular interests. However, Henry could not entirely extricate early Smithsonian activities from wider belief that the public was entitled to the Institution's scientific work. The 1850's Smithsonian became a site of debate regarding the legitimate purpose of the Institution, and more broadly, American science. Although professionalizing forces would reshape scientific practice in the United States by the end of the century, debate surrounding Henry's vision for the Smithsonian Institution demonstrates that this was not a straightforward process nor was it determined by elite men of science alone.

The tension between Henry's plan of organization and public expectations for the Smithsonian was highly visible in the discourse printed in popular publications during the Institution's first decade. Newspapers and journals at the time were critical of the limited access to the Smithsonian's publications and denounced many of its abstract research projects as useless to the majority of Americans. Arguing that the Smithsonian fund was meant to create more utilitarian knowledge and diffuse it among the American public, influential agricultural interests particularly sought to use the Smithsonian fund to promote agricultural science and farm improvement. While the Smithsonian publications remained contentious, some projects undertaken by the Institution were simultaneously perceived in the press as serving practical interests and did receive broader support and involvement from the scientifically interested public. These discussions in the press demonstrate how, despite his efforts to enforce his professional

vision for Smithsonian research, Henry was forced to contend with public opinion in the Institution's first century.

Not all aspects of Henry's plan of organization were met with approbation from the general scientific public. The Smithsonian Meteorological Project, a major research initiative undertaken by the early Smithsonian, received more support from the popular press than the publications program. While Henry initiated the project to collect data which would be utilized by select men of science to produce theories and discover laws governing weather patterns, he relied on a corps of volunteers from the broader scientifically interested public. These observers were not passive contributors and, in exchange for their data labor, requested Smithsonian research publications, meteorological instruments, scientific advice, and the publication of their data to serve their own, often practical scientific pursuits. To obtain the data for his goals, Henry was forced to intertwine his own interests with the more utilitarian ones of the extended scientific community. To meet the project's financial needs and observer expectations, Henry partnered with the United States Patent Office and produced materials from the project data for the office's own agricultural mandate, ultimately shifting the character of the Smithsonian Meteorological Project away from formal, theoretical research.

While the extended scientific community that comprised the Smithsonian meteorological volunteer network was highly influential in shaping the national project, the Institution's published lists of observers did not always reflect the reality of who collected data for the project. The scientific work of conducting daily meteorological observations could permeate entire households where observer stations were located, often drafting the labor of women—whose work was more ideologically fixed to the “private” sphere. While some women were active, credited correspondents in the project, other women remained unnamed in published

observer lists and their motivations and interests obscured in the correspondence of their male associates and family members to whom their work was attributed. At southern observation stations, enslaved men and women's appropriated labor granted white observers the leisure time to complete meteorological journals. These individuals may also have more directly enabled the project in collecting weather data for absent slaveholding observers' records. Although the contributions of observers who were excluded from published records of volunteers was essential to the regular submission of complete data records, these contributors remained relegated to the periphery of American science.

While this study largely centers the relationship between the scientific work of the Smithsonian and the mainstream scientifically minded public, the patterns of devalued and underrecognized data workers which appeared in the Smithsonian Meteorological Project remains, in many ways, entrenched in professional scientific fields. In 2020, data scientists Catherine D'Ignazio and Lauren F. Klein described the persistent role of historic and present hegemonic forces in shaping data science and knowledge creation. To counter traditional and entrenched practices created to prioritize the power of "elite, straight, white, able-bodied, cisgender men from the Global North," D'Ignazio and Klein propose a feminist approach to data science.

The work of data feminism is first to tune into how standard practices in data science serve to reinforce these existing inequalities and second to use data science to challenge and change the distribution of power. Underlying data feminism is a belief in and commitment to *co-liberation*: the idea that oppressive systems of power harm all of us, that they undermine the quality and validity of our work, and that they hinder us from creating true and lasting social impact with data science.³²⁹

To perform such work, D'Ignazio and Klein approach data science not as neutral, but as a field shaped by the experiences of all the people involved in the data lifecycle. "No dataset or analysis

³²⁹ Catherine D'Ignazio and Lauren F. Klein, *Data Feminism* (Cambridge, MA: MIT Press, 2020), 8-9.

or visualization or model or algorithm is the result of one person working alone. Data feminism can help to remind us that before there are data, there are people...”³³⁰ Identifying the people who historically contributed to science from the periphery, such as the women and enslaved individuals who participated in the Smithsonian Meteorological project, and the constructs by which their intellectual labor was devalued is important to data feminism. In doing so we may gain a fuller understanding of embedded prejudices in data production practices and enduring systemic knowledge creation biases that impacted the development of professional fields of science, biases that, as D’Ignazio and Klein make clear, continue to inform our understanding of scientific work today. Thus, we can better challenge and address identified patterns of enduring inequalities to alter how we assign value to different aspects of data science work and legitimate knowledge creation processes.

Henry’s vision for the early Smithsonian made the Institution a site of tension between professionalizing forces and republican science as he sought to redefine boundaries of legitimate knowledge creation as well as who he believed was entitled to that knowledge. As evident from discourse surrounding the mid-nineteenth-century Smithsonian’s activities, this process of professionalizing science was contentious and made further complicated by continued reliance on intellectual labor of persons actively excluded from circles of legitimate knowledge to build scientific institutions. This contradiction continued in such institutions into the twentieth century. Despite Henry’s attempts to establish a research institution driven by the work of select “suitable persons,” the influence and demands of the scientifically interested public forced him to compromise his vision and ultimately forced the Institution into becoming the *de facto* national museum—a status later solidified and developed by Henry’s successors.

³³⁰ D’Ignazio and Klein, *Data Feminism*, 10.

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