



PROJECT MUSE®

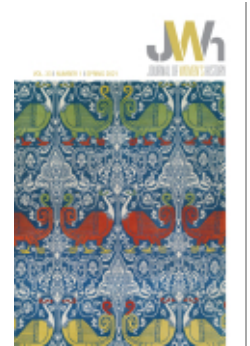
Gendering Nineteenth-Century Data: The Women of the
Smithsonian Meteorological Project

Sara J. Grossman

Journal of Women's History, Volume 33, Number 1, Spring 2021, pp.
85-109 (Article)

Published by Johns Hopkins University Press

DOI: <https://doi.org/10.1353/jowh.2021.0004>



➔ *For additional information about this article*

<https://muse.jhu.edu/article/785521>

GENDERING NINETEENTH-CENTURY DATA:

The Women of the Smithsonian Meteorological Project

Sara J. Grossman

This article uncovers the work of several groups of white women who acted as weather data collectors and meteorological calculators for the Smithsonian Meteorological Project, the first settler-operated national weather data collection project in the United States. Working with correspondence and institutional publications, I show how these women understood themselves as weather data laborers, how they utilized patriarchal power to navigate male meteorological culture and, finally, the ways they were met with resistance and erasure under that same system. I argue that although this appeared to offer a utopian opening for some women to enter scientific roles, weather data collection and calculation practices in the mid-nineteenth century were tied up in power structures which inhibited women's ability to practice environmental data collection and reduction, positioning masculine skills at the center of meteorological data labor and women's data labor at its edge.

In 1848, the Smithsonian Institution began the first settler-operated national weather data collection project, which utilized volunteers from across the country (and not simply from the eastern region) to perform daily weather measurements.¹ Measurements were sent to the Smithsonian Institution monthly, and these efforts eventually led to the formation of the National Weather Service.² Anna Bowen—a settler on the homelands of the Omaha (UmoNhoN), now called Elkhorn City, Nebraska—began reporting as a volunteer meteorological observer in 1858 for the Smithsonian Meteorological Project.³ In her first month of observation, she recorded thermometer and “face of the sky” data three times every day for the entire month.⁴ Bowen was also interested in precipitation, but lacked the necessary instrument—a rain gauge—for making these readings. Instead, she marked a line of rain on her returns for that year and sent it in, hoping that the makeshift measure would suffice. In the same letter, she requested a rain gauge from the Smithsonian Institution. Later that year, Bowen wrote on the bottom of her submitted register for the month, “The rain gauge promised us never came to hand— Can you send us one?” A note scribbled on Bowen’s letter, which now resides in the Smithsonian archives, stands as a kind of response: “Wait a little longer.” It is not clear who read Bowen’s note, nor whether this scribbled response was ever sent back to Bowen herself. What is clear

is that Bowen never received a rain gauge in 1858, nor did she receive a gauge in 1859.⁵ In fact, throughout Bowen's entire volunteer relationship with the Smithsonian—one that would last until 1864—she never received the rain gauge she had requested.⁶

And yet, by 1860, three male observers in Bowen's home territory of Nebraska—James Allan, Reverend William Hamilton, and John G. Rain—had access to and were actively utilizing rain gauges for the meteorological observations that they were sending to the Smithsonian Institution. Both Allan and Rain were somewhat unreliable observers: Allan's returns were infrequent, as in 1861 when he returned only two monthly meteorological registers for the entire year, and although Rain had been furnished with a full set of instruments, he would only report back to the project from 1860 to 1861, a single year. Another Nebraska volunteer, John Evans, who began reporting for the project one year after Bowen's requests for a rain gauge in 1859, also utilized a rain gauge for his Smithsonian weather measurements. Yet, he too was an unreliable observer, reporting for only five out of twelve months in 1863. Anna Bowen, on the other hand, never missed a month of observation in the eight years she reported to the Smithsonian Meteorological Project.

Recently, scholars of information have pointed to gaps in feminist and women's studies of data labor. Historians of science Marie Hicks and Jennifer Light offer untold histories of women computers and gender discrimination in the mid-twentieth century.⁷ Digital humanist Lauren Klein and urban planning scholar Catherine D'Ignazio approach this from a contemporary lens, advocating for a "data feminism" as a way of bringing bodies back into discussions about data collection and cultural data work, such as content moderation.⁸ Media and communications scholar Yanni Alexander Loukissas argues for studying data through a "local lens," showing how data is "inseparable" from "social, material, and spatial conditions."⁹ My research shows that there is historical precedent for the contemporary critique that Klein and D'Ignazio rightfully locate within the data sciences today, and delves further back, historically, than Hicks and Light to offer a nineteenth-century example of women, data labor, and gender discrimination. The work I do here to bring women back to histories of data labor reassembles data history at the "local level," as Loukissas advocates, uncovering the social, material, and spatial conditions of mid-nineteenth century data labor.

The nineteenth century was an emergent period for the professionalization of science in the United States, as historians of science Sally Kohlstedt, George Daniels, Nathan Reingold, and law historian Kara Swanson have shown.¹⁰ But even more than a time of professionalization, this period was a revolutionary time for women in particular, as Kohlstedt and Swanson

elaborate. In this period, white women attempted to gain access to, and practice within, newly professionalizing scientific communities in ways that were not possible earlier in the century. More specifically, the emerging field of meteorology, which was developing through citizen science practice across the nation, offered women an opportunity to become a part of a coast-to-coast scientific network open, at least on paper, to “friends of science.”¹¹ The Smithsonian Meteorological Project—headed by Joseph Henry, the first secretary of the Smithsonian Institution—was a correspondence network that relied on the postal service. For this reason, men as well as women were able to write into the Meteorological Project.

Historians of women’s science have shown that while women were able to address this seemingly open scientific network, their efforts to become part of this community were met with resistance and sometimes erasure.¹² This article adds to that story, providing further evidence of this resistance and erasure within meteorological science, attending to the ways that supposed gender differences “are used to rationalize power differentials and divisions of work in the home and the labor market.”¹³ Far from an historical anomaly, Anna Bowen’s experience can be understood as part of this historical moment. Bowen was not the only self-identified woman who requested, but struggled to receive, materials for volunteer observation as part of the Smithsonian Meteorological Project. Bowen’s story is one entry point into a complicated narrative about the ways that publically self-identified and self-disclosed women in the mid-nineteenth century became a part of a white, male, settler-colonial meteorological science.¹⁴ In section one, I articulate the general trends of women volunteers, outline the meteorological culture that women created for themselves, and offer case studies of three women who were treated in markedly different ways than their male counterparts at the time.

The second portion of this article explores a group of fifteen women computers from Easton, Pennsylvania, and their work copying and calculating meteorological data for the Meteorological Project. Here, I show how meteorological calculators from Easton participated in a less visible, yet equally vital, part of the Smithsonian Meteorological Project. At Lafayette College, James Coffin—head mathematician for the Smithsonian Meteorological Project who had agreed in a written commitment to the Smithsonian’s “incoming and accumulated observations”—utilized the labors of women public school teachers from Easton to copy and calculate multi-year meteorological data.¹⁵ The names of these women never made it to the Smithsonian or Patent Office billing books, nor did they receive special thanks in the final publication of materials.¹⁶ The tale of two groups of women laboring for meteorological science—one in semi-public and the

other in private, one performing the initial collection of meteorological data and the other tasked with its calculation—provides evidence of women attempting to stake their claim to national scientific work as early as 1848.

This narrative will travel from Washington, DC to Easton, Pennsylvania to Elkhorn City, Nebraska Territory, and back again. The historical characters in this story include famous women, like Clara Barton, as well as women computers whose work shaped scientific practice in the mid-nineteenth century, but whose names could not be recovered. Taken together, the named and nameless women volunteers, computers, and copyists who were part of this project helped to build the foundation of the first national, settler-colonial meteorological data collection and computation system. This article shows how they were both under and overutilized, incredibly visible and persistent volunteers and yet also hidden away in their homes performing copying and calculation work for the project. In the kitchens in Easton and in the basement of the Patent Office, the fact that women were in physical proximity to men meant that their labors were cordoned off to semi-private or hidden spaces. A century before the hidden figures of twentieth-century computing and engineering, women “engaged in scientific work” but “remained on the periphery of the scientific community” whether they were in the field performing meteorological data readings or in their kitchens or the Patent Office basement performing copying and calculating work.¹⁷ Although James Espy and Joseph Henry—creators of the Meteorological Project—promoted the vision that meteorological volunteer work required no special training, the skills associated with volunteer-based science were positioned by men as masculine traits. But the records show women performing this very same work across the period.¹⁸ As was true in other domains where women attempted to claim their place—such as women attempting to enter clerkship and merchant work at the time—there was nothing “inherently masculine” about any of these forms of labor other than that men had traditionally performed them.¹⁹ Studying the letters and labors of the ladies of the Smithsonian Meteorological Project—from the field, to the kitchen, to the Patent Office basement—shows how weather data collection and calculation were socially embedded processes for self-identified women at the time. White women were able to enter meteorological science only by furthering the intertwined projects of settler colonial expansion and white male supremacy, a supremacy which sought simultaneously to utilize and erase their efforts.

Women in the Field: Bowen, Young, and Baer

Anna Bowen had been misled. In 1849, word of the Meteorological Project was circulating through regional and national channels, from news-

papers to reports and circulars. In March of 1849, the *Semi-Weekly Eagle* from Brattleboro, Vermont reported that “[t]he Smithsonian Institute will assume the burden of furnishing the necessary instruments to those, who are unable to do it themselves.”²⁰ The Smithsonian circular—which noted that “[b]lank forms free of expense will be sent to those who are disposed to join in the observations, & as soon as the amount of funds for this purpose is sufficient, full sets of instruments will be furnished to careful observers in important localities”—had been “distributed to the several parts of the Union through members of Congress” starting as early as 1848.²¹ By 1852, the Smithsonian announced in their annual report that a “set” of instruments “consist[ing] of a barometer, thermometer, hydrometer, wind-vane, and snow and rain gauge” was available for purchase at a “reasonable price,” or on loan, from the Institution.²² By 1856—just three years before Bowen would write to the project to request her rain gauge—the Smithsonian announced that “[a]n appropriation has also been made for the purchase of a large number of rain-gauges, to be distributed to different parts of the country for the purposes of ascertaining more definitively with compared instruments the actual amount of rain that falls in the different sections of our extended domain.”²³ What did distribution look like in practice? Who would, according to the Institution, be counted as a “careful observer”?

In this section, I investigate women’s requests for and access to scientific materials—such as meteorological forms and rain gauges—arguing that, unlike their male counterparts, women often waited longer for tools and instruments when they requested them from the Institution. This difference signified who could participate in popular science, including weather data collection and calculation. I also survey the variety of concerns that women of the Smithsonian Meteorological Project expressed through their letters, highlighting several of the main characters in the lifespans of the Smithsonian Meteorological Project. As meteorological practice moved from state-based systems to a national one, men were favored as data collectors and calculators despite the fact that the national system was supposedly open to all “friends of science” regardless of gender.

Before considering Bowen and several other women like her more closely, it is important to understand what the Smithsonian Meteorological Project was and how women created and participated in a distinct type of scientific culture related to gender norms at the time. The project was established in 1848 by Joseph Henry, the first secretary of the Smithsonian Institution, and ran until 1870.²⁴ The project gathered data—temperature, barometer, rain, cloud, and severe weather data—from volunteer observers across the nation. 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.²⁵ The geographic

distribution of these observers extended no farther west than Nebraska Territory. From 1860 to 1870, forty-six additional women joined the Smithsonian Meteorological Project as volunteer observers, roughly 25 percent more than the previous period, with two observers reporting from as far west as Spanish Rancho and Honcut, California. In this period, we find a large number of women reporting instrument readings to the Institution—Julia Child, Charlotte Rockwell, Miss Bella Moore, Lillie Thrift, and Miss Horn observed the weather with a thermometer and barometer; Anna Spencer, Rebecca Sheppard, Miss Proctor, and Mrs. Ryerson took to the field with a thermometer, barometer, rain gauge, and pluviometer.²⁶ By classifying women's labor practices, affective concerns, and forms of meteorological data production, we see how white women engaged the Smithsonian's open call for volunteers, sending multiple requests for materials and information when their first, second, and sometimes third requests went unanswered. Despite the fact that more women were reporting with instruments in the second period of the project, women still encountered many hurdles when trying to gain access to the communication networks and tools needed to fully participate in the project.

When Susannah Spencer wrote to the Smithsonian in 1853, a year after she had begun observing for the Institution, she offered her records of "periodical phenomena of animal and vegetable life" freely.²⁷ Despite this fact and that Spencer had volunteered her services in 1852 and 1853, she was never included in the official list of volunteer observers. While some women received credit for their work, others did not. Maria Mitchell, the nineteenth-century astronomer and then-librarian from Nantucket, would have a similarly frustrating experience with the Institution. Mitchell, who had been keeping her own meteorological records at the Nantucket Athenaeum, received blanks from Joseph Henry on September 10, 1855. Mitchell's name does not make the official record, although she clearly was involved in meteorological observation. Instead, her husband's name is listed in the observer record for Nantucket, 1853–1861.²⁸

Women's letters were often marked by fear that their observations and calculations would be full of error and therefore not useful to the Institution.²⁹ An 1856 letter from Mary Goff read: "Enclosed are the tables for the last two months. . . . Please do let me know if there are any alterations to be made in the tables."³⁰ From Goff's reference to possible "alterations to be made in the tables" to women observers alluding to their "mistakes," women were cautious participants in the Meteorological Project, fearful of the quality of their work. This is valuable because it speaks to how women constructed their own identities as workers rooted in their own perceptions of the values of their labors. Although more women were observing

the weather with fuller sets of instruments, this feeling remained a vital part of what it meant to be a women observer through the late 1850s and 1860s. In 1859, Sara Thomas wrote, "I am aware that any reports are open to many criticisms and have feared that you might find them of little or no use. Should they be of sufficient value for you to wish for their continuance, I shall be obliged to ask for another supply of blanks."³¹ Despite the fact that throughout the Meteorological Project period women were active contributors to the meteorological data landscape, they often feared that they would produce useless or bad data.

While women were undoubtedly capable of producing meteorological materials that were just as valuable as their male counterparts—and sometimes more valuable, as Mitchell's life-work shows—they faced significant hurdles brought about by a scientific culture that marked male bodies as the idealized body. This sexism, which was a general attitude of time, inflected women's own understandings of their observations, as they often worried they had produced something that would be incorrect or not useful in the Institution's eyes. Even more, as the case studies that inform the remainder of this section suggest, the veracity of data was often connected to gendered bodies: female bodies were not historically marked as the arbiters of scientific data.

When Bowen wrote to the Institution to request a rain gauge, her request was not out of the ordinary for what the Institution might expect as a request. And in fact, the Institution had been fulfilling instrument requests throughout the 1850s, keeping detailed records of instruments loaned to volunteers. In "Meteorological Instruments Loaned, 1850–1870," we see that Dr. Reverend Hamilton from Bellevue, Nebraska Territory, received one Kendell thermometer and one 5-inch rain gauge in 1857. Dr. John Evans was provided with ten thermometers. Although Evans was an unreliable primary observer throughout the late 1850s, he was tasked with "distribut[ing]" instruments "on the route to Oregon" in the early part of the decade.³² Bowen's request for a rain gauge not only had to be read and understood as legitimate in Washington, DC, but it also had to be understood as legitimate by the likely-to-be male distributor of the instruments within the state. Although she was clearly interested in the rain—as she drew rain lines in an attempt to measure rain, as a gauge would, on her blank form in 1858—Anna Bowen's requests for a rain gauge went unfulfilled and she was therefore not able to cultivate her scientific interests as male observers with access to instruments could at the time.³³

Institution records show that Bowen was seventeen years old when she began observing. She continued to report to the project up until 1864 under the name Miss Anna M.J. Bowen, at which time she married John Smiley.

Bowen stopped recording and passed along weather records to her brother John S. Bowen. John utilized a thermometer, the same instrument that Anna Bowen was equipped with over the last 8 years, to perform his meteorological duties. John S. Bowen's requests for blanks were met efficiently as he continued to write to the Institution throughout the 1860s. On November 30, 1866, J.S. Bowen wrote, "Your observer was compelled to use the whole of the blanks last sent to make of his weather for the ensuing year. There were no envelopes sent with them. Oblige by sending supply of both."³⁴ A clerical note on the letter reads, "Sent, December 28th."³⁵

White women were deeply connected to and dependent on the men in their lives (primarily husbands and fathers) while they were pursuing meteorological science and volunteer work. At the same time, volunteer science was on the rise in the United States and was especially common as a familial activity. For this reason, 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. This possibility of blur in scientific roles within the sphere of meteorological volunteerism is what allowed women to enter the community. As early as 1849, at least one other woman had reported as an observer to the project—Mrs. L. Young. Mrs. Young was noted as the only woman observer for the year of 1849. Young was the sole observer noted in the Smithsonian meteorological records, yet all of her letters were signed "L. Young," utilized male pronouns, and seemed to be written from the perspective of Mr. Lawrence Young. Did Mr. Young write the letters while Mrs. Young conducted the observations? Or, was Mrs. Young simply the note taker while Mr. Young conducted observations and wrote the letters? It is possible, one might speculate, that Mrs. Young was in charge of the enterprise the whole time, not only performing and noting the observations, but also writing in the voice of her husband and signing her letters L. Young in order to be involved with the scientific enterprise. However, my interest here is not necessarily settling the issue of who really penned these letters, but rather in illuminating the historically porous and slippery boundaries between data laborer roles in this period.

The Youngs' first letter to the Institution emphasized interest and willingness to serve the Smithsonian in a volunteer capacity, noting that they had heard about the Smithsonian's plan to "organize for the collection of meteorological facts" having seen the meteorological circular in a journal. They continued: "Fearing you may be deficient in collaborators, I have taken the liberty to address you alone merely to say I wish the enterprise success—and that if no better opportunity presents itself for your making a station in or near Louisville than my offer—you are at liberty to avail yourself of our observations."³⁶ The letter moves between the use of "I" and

“our” and, while the voice in the letter offers to enter the volunteer project, the deferential turn of phrase “if no better opportunity presents itself” is used. Reports for the year of 1849 listed Mrs. Young as observer in Springdale, Kentucky, and Mrs. Young remained the listed observer throughout the project period.³⁷ As letters show, “Mrs. Young” needed materials for observation throughout the 1850s. While it is not clear whether Mrs. Young was writing on behalf of Mr. Young, or vice-versa, it is clear that Mrs. Young was involved in meteorological measurement and that the nature of her involvement was intimately tied to her marriage to Mr. Young.

Much like Bowen, L. Young and Mrs. Young struggled to receive materials from the Institution. In 1850, L. Young requested information about procuring a barometer for the second time: “Some time since I wrote you a few lines inquiring from what source I would be most likely to obtain an accurate barometer—Since that writing I have been induced to think J. H. Temple of Boston a skillful manufacturer.”³⁸ L. Young went on to request advice on this matter, should the Institution have any and noted that Mrs. Young had run out of blanks. On her returns for July or August of 1851, Mrs. Young noted that she needed a new supply of forms.³⁹ In September of the same year, L. Young wrote two letters to the Institution: on September 2, L. wrote, “Mrs. Young is without blanks for additional numbers of her series of Reports.”⁴⁰ And again on the 30th of September, “In forwarding the last monthly reports—Mrs. Young stated the fact that her blanks were exhausted—two months remain now unreported for want of blanks of which I take this opportunity to appraise you.” On January 10, 1852, L. Young wrote, “Gentlemen, Having heretofore signified by two letters at different periods that the blank form for meteorological reports were exhausted and asked for renewals if copies of our tables were desired I was led to conclude you had met with some neighboring reporter more to your acceptance and had dispensed with ours.”⁴¹ The Institution did finally respond to L. Young, sending blank forms and information about a James Green barometer, but the Institution waited a while to respond—was this because the primary observer was a woman? Is it possible that Mrs. Young’s blank requests were taken less seriously because they arrived without L. Young’s letters; or, put another way, without a male sponsor? Was Mrs. Young the Anna Bowen of the early 1850s?

Mrs. L. Young, one of the longest-serving observers within the Meteorological Project, volunteered her efforts from 1849 to 1868.⁴² While Mrs. Young’s name was replaced by Mr. L. Young from 1851 to 1855, her name returned to the books in 1856. In the Smithsonian Institution’s 1873 Annual Report, which included a comprehensive list of all previous volunteer observers, Mrs. Lawrence Young was noted as the sole observer for Springdale, Kentucky, from 1849 to 1868.⁴³

Entering the project earlier than 1854 might have proved challenging for women given the views of Lorin Blodget, who was hired by Joseph Henry in 1851 to reduce meteorological data and prepare meteorological reports for publication. Blodget was not only responsible for reducing observer data, but was also in charge of "conduct[ing] the institution's meteorological correspondence with the volunteer observers" from 1851 until he was dismissed from the project in 1854 over a dispute about meteorological data ownership.⁴⁴ This meant that any women observers wishing to be part of the Meteorological Project would have their letters received by Blodget, who had been frank about the people he believed belonged in Henry's and Espy's "friends of science." His public remarks on scientific matters included: "Only the best minds can successfully undertake scientific calculations and computations; and these must possess a half masculine strength and endurance."⁴⁵ Here, Blodget indicated the qualities that women scientists were expected to possess if they wish to practice science, and these, of course, included the masculine traits of "strength" and "endurance."

There were clear limits to who could participate in volunteer observation and data production. That must reflect how we read the historical participation of women in this period. In theory, the Meteorological Project should have been open to any "friend of science." But in practice, the Meteorological Project was predominantly white and male, and the borders of the project were officially and unofficially policed by men enforcing social norms undergirded by overt and non-overt sexism. Men in power were creating new norms around gendered scientific labor that preserved their dominance; women sought to gain admission to volunteer science through male networks.

Blodget was the party responsible for answering the Young's letters between 1851 and 1854. It was no coincidence that Mrs. L. Young was blotted from the record when Blodget began handling correspondence for the project, and that she returned to the record book in 1857, three years after Blodget's firing. Joseph Henry's views on women were more progressive than Blodget's. Henry was involved in preparing a report that reviewed the Rutgers Female Institute in 1842. This report assessed the role of the sciences in female education. Henry conducted an "examination" and concluded that "the Committee have been strongly impressed with the importance of the Mathematics in female education."⁴⁶

Much like Mrs. Young, Harriet Baer of Maryland utilized male aid in becoming and remaining a part of the meteorological network throughout the 1850s and 1860s. Born around 1820 in Maryland, Baer began acting as a volunteer observer in 1851. Much like Young, Baer's labor was uniquely attached to a male figure, her father William Baer, an agricultural chemist.

While letters from the period reveal that both William and Harriet Baer were active letter writers to the Smithsonian Institution, Harriet Baer often penned letters for her father, signing as “Harriet Baer on behalf of William Baer” as well as writing letters to the Institution by herself without her father’s aid. Harriet Baer’s letters reveal again the ways in which the patriarchy—here a father’s power—might act as a conduit for emerging women in science.

Although Harriet had been reporting with her father since 1851, it was not until 1855, a year after Blodget’s firing, that she was acknowledged as an observer in the volunteer record. Harriet Baer was a frequent correspondent—penning thirteen letters to Joseph Henry, ten of which can be classified as letters of request. In these, Harriet requested blank forms and seeds, as well as clarification on delays of materials. Like Mrs. L. Young, Harriet was associated with a male member of her household as she became and remained an active member of the Meteorological Project. But more than this, Harriet’s letters also reveal that even when writing with the aid of the patriarchy, women observers still failed to receive basic materials from the Institution and often spent much energy within their letters begging for materials.⁴⁷ Between 1858 and 1869, Harriet requested blank forms six separate times.⁴⁸ On Feb 8, 1858, she wrote, “I am entirely out of blanks!” In September and October of 1858, Harriet requested blanks again. On March 24, she wrote to the Institution, “The fault is somewhere, but certainly not with me. I have not failed to send the records since I have been keeping the tables.” On July 1, 1858 and January 1, 1859, Harriet wrote pleading, “I’m out of blanks” and “Please send blanks.”⁴⁹

Why did Harriet Baer have to beg for materials, month after month? Compared to Bowen, Baer’s labors show that working with a male member of a household afforded some special privileges in access to instruments—William Baer seemed to have been able to afford a full set of instruments from either the Institution or by mail-order—but the fundamental situation of needing to beg, almost constantly, for materials seemed necessary whether writing with the aid of a male family member or not. Women like Baer and Bowen, as well as Young, waited longer for materials, or were not sent materials at all, although their male counterparts at the time were. Other male observers in 1858 and 1859 received blanks without issue. Because they were not spending their letters begging for materials, they were able to focus, then, on scientific matters, rather than exasperated attempts to request paper and instruments.⁵⁰ While it is true that this was a transformational and overwhelming time for the Smithsonian, and that male observers were also waiting for materials, women often waited longer and, at times, their requests went unanswered. J.S. Pashley of Osceola, for example, wrote on June 1, 1860, “I wrote for more envelopes and two—Herewith goes the last

of those and now I require both blanks and envelopes." A note on the left-hand side of the letter reads, "Send blanks and envelopes; Sent."⁵¹

The cases of Bowen, Young, and Baer show that women's correspondences with the Institution, as well as their journeys into meteorological observation, were influenced by the men in their lives. In waiting for blanks and instruments, women like Young seem to have either employed the help of their husbands or have written under the auspices of their husbands in order to secure entry and materials. Although enlisting the help of male power did not always translate into immediate action—after all, L. Young wrote to the Smithsonian on two separate occasions in 1851 to complain about Mrs. Young's missing material—it was one way that white women at the time used the patriarchy to gain access to a scientific world to which they were often forbidden entry.⁵² The lesson here is that even when women utilized familial male power, they still waited longer than their male counterparts for meteorological materials, and this waiting affected their labors within the project. Anna Bowen never contributed a rain gauge record from Elkhorn City. Her unrequited request translated into an unrequited record.

Understanding how informal and formal gendered practices informed meteorological data collection means diving into how the Meteorological Project was publicized in the late 1840s, the nature of responses received in the early 1850s, and how these responses were dealt with by the Institution throughout the 1850s and 1860s. Doing so reveals that women volunteers were just as eager as their male counterparts to collect meteorological data, but that their practices were often stalled by the bureaucratic details of collection—procuring instruments and weather blanks. Many women observers persisted over periods of two to four years, requesting the same materials over and over again. Sometimes they received them and sometimes they did not.

Gender-based scientific labor frameworks shaped how women were integrated into a meteorological community that had been, in the early part of the century, entirely male.⁵³ Uncovering lost labors reveals how meteorological data has been marked by the legacies of gender exclusivity. While women in the field were gathering meteorological data and sending it to the Smithsonian Institution monthly, another group of women were tasked with calculating the very meteorological data that women in the field were gathering. As the following section shows, women faced similar challenges in working within and for a dominantly male meteorological data culture—these women were often paid less than their male counterparts and they were confined to hidden and domestic spaces in order to perform their calculation work.

The Computers of Easton and the Clerks of the Basement Patent Office

She had decided to take the data with her, out of Easton, Pennsylvania, and away from Lafayette College, where she had been performing calculations for about a year. It was 1857, and although her data was supposed to be bound for the newly established Meteorological Project at the Smithsonian, she had kept them for herself—seven months of numerical weather observation sheets from Swiss doctor Louis Berlandier's travels throughout Matamoros, Mexico. Yes, she had taken them and told no one. And she would keep them with her, through at least one move, for two full years. On the evening of February 28, 1859, she returned the data sheets to James Coffin at Lafayette College, who then wrote to Joseph Henry at the Smithsonian to inform him that the missing data had been returned.⁵⁴

Maybe her name was Maria Kutz, the only census-registered clerk in Northampton County in 1860. But she also could have been Susan R. Miller, Miss E. H. Hoagland, or Miss M. M. Shattuck, all assistant teachers in Easton public schools in 1857 who were likely turning meteorological observations into national climate data for Joseph Henry's Meteorological Project.⁵⁵ Although we do not know her name, we do know that the tables were given to her by James Coffin, who had asked for her help in the reduction of twenty-five years of Berlandier's observations—temperature and rain readings, cloud coverage and wind direction. The unnamed lady was in possession of the weather data because she had been tasked with "preparing" it for Coffin, Henry, and the American public.⁵⁶ She was not alone in this—from roughly 1856 to 1870, twelve to fifteen women from Easton did the work of meteorological data reduction.⁵⁷ Called "assistants" as well as "computers" throughout correspondences and official Smithsonian publications, this work assumed skill in both copying and computation (copying observations from weather tables into a standard table form as well as calculating daily averages from thermometer and barometer readings).⁵⁸ The work of these unnamed women helped Coffin contribute sets of data abstracts and summaries to the Smithsonian, some of which were deposited under "materials . . . relative to the climate of the United States."⁵⁹

Women became an integral part of the Meteorological Project between 1848 and 1870 not only as data collectors in the field, but also as human computers. Much like the women in the field, the Easton computers were able to practice data reduction from their homes, a tactic used by many nineteenth-century women who were forbidden from sharing physical spaces of scientific labor with men, including Clara Barton and Maria Mitchell—two women considered here—as well as Elizabeth Lomax.⁶⁰ The computers of Easton were hired through James Coffin—although Joseph

Henry was aware of the arrangement. Coffin had been utilizing the labors of his daughter since at least 1840, as a copyist for *Winds of the Northern Hemisphere*.⁶¹ Women were invited to enter meteorological computing due to public frustration around the lack of weather data that had been published and made available to the public by the Smithsonian Institution. In his 1856 secretarial report, Henry pleaded for public patience: "Complaints have been made that but few of the materials collected by the Institution have yet to be published . . . it is more important that the information should be reliable than that it should be quickly published."⁶² Henry's remarks suggest a situation of environmental data overload. The fundamental solution to that overload—and the public's impatience in receiving data—was to employ women cheaply, thus allowing them to enter meteorological data reduction.⁶³

In the early months of 1855, Henry and Coffin addressed the issue of data overload. Henry wrote to Coffin that one solution to the problem could be the employment of "students" (seemingly genderless, but all students would be college-aged men at the time) as assistants. On March 16, 1855, Coffin wrote to Henry that he had "accidentally found a very efficient aid" to help with the "reductions of current observations in the form of the Superintendent of the Public Schools of our Borough."⁶⁴ Coffin had connected with the superintendent in an effort to see whether any of the teachers were "careful and accurate computers for such kind of work" when the superintendent asserted that he could take on such work himself.⁶⁵ Although Coffin recognized that "the position he now holds is a responsible one," Coffin expressed "surprise at his offering his services so low" and continued that "[s]ome of the simple operations such as transcribing the results into tabular form I suppose might be performed just as well by females."⁶⁶ In July, Coffin wrote again to Henry noting, "The general reductions are progressing. I have over a dozen persons employed upon the work, mostly teachers of schools in the borough, who have now a vacation of two months."⁶⁷ Although Coffin does not specify gender in his letter to Henry in 1855, Henry announced in the Smithsonian Institution Report of 1856 that "twelve to fifteen persons, many of them females, have been almost constantly employed, under the direction of Professor Coffin in bringing up the arrears and in reducing the current observations."⁶⁸ By 1857, women were employed in more than the "simple operations"—they were involved in correction and reduction.⁶⁹

In addition to reducing Berlandier's observations, the women of Easton joined male computers in the work of reducing one of the first publicly available climate data resources in the United States. They were responsible for bringing their calculation skills to bear on the Smithsonian volunteer tables, the very tables generated by observers like Bowen, Young, and Baer.⁷⁰ In 1856, the computers of the Smithsonian Meteorological Project were respon-

sible for reducing “upwards of half a million of separate observations,” at “an average of one minute for the examination and reduction of each observation.”⁷¹ The practice of reduction included, first, an examination of each “observation” contained in the table and second, “arithmetical calculation.” Each observation form asked observers to record barometer, thermometer, hygrometer readings, as well as rain and snow, cloud coverage and direction, wind direction, air pressure and humidity. Each observer was required to make three readings per day—9 am, 2 pm, and 9 pm. A human computer would sit down with these forms and perform “arithmetical calculation” in order to yield the following results: the “mean, maxima, and minima” of a month’s worth of observations. The process of reduction was a repetitive venture of addition, subtraction, and averaging. As Henry outlined in his 1857 report, computers would have to perform these reductions over and over again on half a million observations in a given year. But they were not at work on one year of collected observations. They were working through five years of reductions, which would in the end, likely total over two million observations in need of reduction.⁷²

Over the seven-year period that Coffin headed the effort to prepare Smithsonian meteorological observations for publication, he utilized the labors of male and female workers.⁷³ In hiring women computers—drawn not from male-only Lafayette College but rather from the Easton Public school system—Coffin emphasized the need to “hire them as cheaply as possible.”⁷⁴ There was too much data to process and not enough labor or money to pay for the processing. In securing a partnership with the Patent Office, Henry had made several things possible. First, he secured funds from the Patent Office for the project so that workers—including Coffin—could be compensated. While Coffin and Henry agreed to pay workers twenty-five cents an hour, there is no evidence that male and female computers were paid the same wages for their work.⁷⁵ Coffin did not submit a list of his employees to Henry. This partnership also meant that the Patent Office was doing more printing and mailing of materials on behalf of the Smithsonian, including printing blank forms for observers and mailing them under the office’s franking privilege.⁷⁶ The same year that Henry and Charles Mason (Commissioner of the Patent Office) began their partnership—and during which Mason offered printing services to the Smithsonian—Mason hired his first cohort of full-time women clerks, including Clara Barton at “ten cents a hundred words,” which was the going rate for male clerks at the time.⁷⁷

Between 1854 and 1865, Clara Barton, who “had perfected a ‘copper plate’ style of handwriting,” was legally employed as a clerk at the US Patent Office.⁷⁸ Barton was invited by Charles Mason to operate as a clerk “copying patent applications, caveats, and regulations.”⁷⁹ Barton’s clerk work

included copy work from the "Department of Agriculture, Smithsonian Institution, and the Weather Bureau."⁸⁰ In addition to being employed as the first official female clerk in the Patent Office, Clara Barton is important to this story because she represents the final node in a network of women laborers who strove—and sometimes failed—to gain access to scientific and meteorological labor in the period. The network extends from women collecting meteorological data across the nation, to lady assistants reducing data under the guidance of James Coffin at Lafayette College, to Barton's office of ladies copying these data sheets for a congressional publication at the Patent Office. Different nodes within this network were given different levels of flexibility to perform their duties as data gatherers and compilers.

From Bowen to Barton, the ways that scientific labor was connected to the body produced gendered data collection and computation practices. Bowen and Barton show that the project evolved under a gender-typical regime of labor that privileged male scientific labor. Clara Barton and her cohort of women clerks were "confined to the basement of the east wing of the Patent Office" where they did not have to "come in contact with the public."⁸¹ Although the ladies had been confined to the basement, their physical presence in the Patent Office building was not welcomed by all. Mason left the Patent Office temporarily on July 5, 1855, for four months. On July 9, then acting Commissioner of the Patent Office, S. T. Shugert, moved Clara Barton and the other full-time female clerks to temporary status.⁸² In addition, Shugert wrote in a letter to the Chief Clerk of the Interior Department: "I have communicated to the Ladies employed in the Patent Office that they must vacate their room within the present month, and also, that the Hon. Secretary promises to give them work from the Land Office, when practicable."⁸³ Women clerks were asked to vacate their basement offices—they were being phased out. Robert McClelland, Secretary of the Interior, agreed: "I have no objection to the employment of the females by the Patent Office, or any other of the Bureaus of the Department, in the performance of such duties as they are competent to discharge, but there is such obvious impropriety in the mixing of the sexes within the walls of a public office."⁸⁴ The problem was not a woman's capacity to do the work assigned—or so they said—but rather that the physical presence of women threatened the masculinized practice of male science. On behalf of preserving scientific and social space where "only men could be comfortable," it was clear that the women had to go.⁸⁵

From Easton to Washington, DC, there were differences in male and female data production. Because men were allowed to publicly claim their connections to data practice and production, they were also allowed to work *publicly* on data reduction. Male computers were able to work on their reductions at Lafayette College in the Star Barn—the Meteorological build-

ing on campus—or in the Mathematics Building, in Patent and Smithsonian Institution offices. Women were often required to perform their reductions at home. This was the case for the Easton ladies, for Clara Barton, and at least three additional women “clerks,” who set the data reductions from the Easton ladies to print for Congress. While Clara Barton and her crew began their work in the basement of the Patent Office (consigned there so that they did not come into contact with male Patent Office workers), they were forced at times to do their meteorological copying work at their homes. In the late summer of 1855, after Shugert and McClellan voiced their disdain for “mixing of the sexes within the walls of public office,” Barton “clean[ed] out her desk and work[ed] from home as a copyist.”⁸⁶ When she returned to her desk in the fall of 1855, after Charles Mason returned, “a campaign of harassment by some of her coworkers evidently began.”⁸⁷ All of her coworkers were male.

Conclusion

The weather data that ladies in the field, in Easton, and in the Patent Office basement helped create was printed and used, according to Henry, for isothermal and rain mapping of the country. Their work led to the first published account of weather and climate data in the United States based solely on national volunteer data.⁸⁸ Taken together, women meteorological computers in Easton, clerks like Barton, and observers like Anna Bowen are constellatory stars in the scientific labor system that defined mid-nineteenth century scientific work for white women. Locating this constellation re-centers nineteenth-century meteorological and science culture away from exclusively male narratives and toward the underexplored roads that women took to shape meteorological science, weather archives, and public data at the time. Barton’s story of struggling to maintain her appointment as a clerk while remaining visible within the male workforce in Washington is illustrative of a larger dynamic at play in this period that has to do with the expression and regulation of data (whether in the field or in the office) through the politics of the body and the racialization of data labor. Barton’s expulsion from the Patent Office was due to the way her body had been marked by gender, despite her incredible skill; yet it was also her whiteness that allowed her access to this space in the first place. Coffin’s employment of “cheap” female labor was founded on the practice of paying gendered bodies less; Blodget, Shugert, and McClellan saw the female body as a threat to male spaces of labor and science, thereby policing them out of practice.

Although one’s gender did not make for the production of a different type of data, weather data collection and calculation practices in the mid-nineteenth century were tied up in power structures which made it impos-

sible for women to practice environmental data collection and reduction as men could and did at the time. While women “entered civil society in the 1790s and in increasingly large numbers in later decades,” as historians of women’s labor note, women were not able to practice data collection and calculation in the same ways that men did at the time.⁸⁹ Women struggled to claim their visibility within the public sphere because of what their bodies symbolized or advocated.⁹⁰ This is what we see in the meteorological data atmosphere: women doing the work of making weather data, reducing data tables, and copying data blanks without being able to claim their practices publicly. When they did attempt to claim these practices publicly—in letters to the Smithsonian and in Patent office basements—they were seen as threatening to established systems of male dominance. These threats reveal that the culture of weather data production—from the field to Easton and the basement of the Patent Office—depended on a gendered labor system.

Two final points on this archival endeavor. First, this study suggests that white women both struggled to gain access to and simultaneously aided in settler science. Building on this study, my future research outlines how scientific institutions and meteorological volunteers often participated in and advanced settler-colonial logics, including Indigenous land theft. This participation and advancement allowed for the material practice of settler science. Although their data labor broke the boundaries of white male science, women are also complicated—compromised and complicit—figures within the longer history of US settler science and colonialism. Second, in order to enumerate this history of women in science within a larger period bound to male dominance, it was necessary to work with murky records and blurred accounts. Unfortunately, this was—and is—precisely the point. Yet, even these women left a trail, as overgrown as it may be. I hope that my efforts have cleared the overgrowth a bit so that someone else might find their way down what is likely a much longer path.

NOTES

Grateful acknowledgement is made to the Smithsonian Institution Archives—especially Dr. Pamela Henson, Kathy Dorman, and Tad Bennicoff—and Bryn Mawr College for supporting this work. Special thanks to Kathleen Corcella, Micah Maben, Emma Hoffman, and Victoria Say who supported this research in the spring of 2019.

¹Traditional ecological knowledge (TEK) existed long before settlers began measuring the weather in this period. This included manifold Indigenous ecological knowledges that existed prior to, during, and beyond nineteenth-century settler colonial expansion. See: Raymond Pierotti and Daniel Wildcat, “Traditional Ecological Knowledge: The Third Alternative,” *Ecological Applications* 10, no. 5 (October 2000): 1333–1340; Robin Wall Kimmerer, “Weaving Traditional Ecological Knowledge into Biological Education: A Call to Action,” *BioScience* 52, no. 5 (2002).

²I hesitate to use the language of the “national” here, for it was precisely the notion of nation that was shifting and contested in 1848. For example, many of the midwestern women who reported as meteorological volunteers to the project were illegally occupying Indigenous lands, with the desire to settle, while collecting meteorological data. The myth of a white settler nation traveled hand-in-hand with meteorological science, settler colonialism, and Indigenous land theft.

³See James R. Fleming’s *Meteorology in America: 1800–1830* (Baltimore, Maryland: Johns Hopkins University Press, 1990). Smithsonian Institution, *Annual report of the Bureau of American Ethnology to the Secretary of the Smithsonian Institution*, (Washington: United States Government Printing Office, 1895), 791.

⁴“Face of the sky” was a data recording technique that relied on sensory observation to denote cloud cover, the force of the wind, rain and snow.

⁵Smithsonian Institute (SI), *Annual Report of the Board of Regents of the Smithsonian Institution* (Washington: United States Government Printing Office, 1850). Hereafter known as SIAR. See list of observers within reports for 1850–1865.

⁶SI, *Annual Report*, 1850.

⁷Jennifer S. Light, “When Computers Were Women,” *Technology and Culture* 40 no. 3 (Baltimore, Maryland: Johns Hopkins University Press, 1999), 483; Mar Hicks, *Programmed Inequality: How Britain Discarded Women Technologists and Lost Its Edge in Computing* (Cambridge, Massachusetts: MIT Press, 2018).

⁸Lauren Klein and Catherine D’Ignazio, “Bring Back the Bodies” and “Show Your Work,” in *Data Feminism* (community review draft, Boston, Massachusetts: MIT PubPub, 2019).

⁹Yanni A. Loukissas, “A Place for Big Data: Close and Distant Readings of Accessions Data from the Arnold Arboretum,” *Big Data & Society* 3, no. 2 (2016), 4.

¹⁰On the emergence of professional science, see George H. Daniels’ periodization in *The Process of Professionalization in American Science: The Emergent Period, 1820–1860* (Cambridge, Massachusetts: History of Science Society, 1967).

¹¹See Nathan Reingold, *Science in Nineteenth-Century America: A Documentary History* (Chicago: University of Chicago Press, 1985): 128; as well as Sylvia D. Hoffert, “Female Self-Making in Mid-Nineteenth-Century America” *Journal of Women’s History* 20, no. 3 (2008): 34–59; Sally Gregory Kohlstedt, “In from the Periphery: American Women in Science, 1830–1880,” *Signs: Journal of Women in Culture and Society* 4, no. 1 (1978): 81–96.

¹²See Kara Swanson, “Rubbing Elbows and Blowing Smoke: Gender, Class, and Science in the Nineteenth-Century Patent Office,” *Isis; an International Review Devoted to the History of Science and Its Cultural Influences*, 108 no. 1 (2017): 40–61; See Hoffert, and Kohlstedt.

¹³Janet Abbate, *Recoding Gender: Women’s Changing Participation in Computing* (Cambridge, Massachusetts: MIT Press Ltd, 2017), 4.

¹⁴Whiteness was a powerful category across the nineteenth century, as Cheryl Harris and Gregory Smithers argue. In "Whiteness as Property," Harris writes, "The racialization of identity and the racial subordination of Blacks and Native Americans provided the ideological basis for slavery and conquest." In addition to Harris, Smithers argues that the category of whiteness was contested across the nineteenth century. Yet, despite this categorical contestation, the ideology of whiteness shaped power structures in this period, resulting in intersecting injustices and disposessions. My research takes seriously the ideological power of whiteness across this period. See: Cheryl I. Harris, "Whiteness as Property," *Harvard Law Review* 106, no. 8 (1993): 1707–1791, 1715; Gregory D Smithers. *Science, Sexuality, and Race in the United States and Australia, 1780–1940*. (Lincoln: University of Nebraska Press, 2017). On the relationship between settler colonialism and heteropatriarchy, see Maile Arvin, Eve Tuck, and Angie Morrill, "Decolonizing Feminism: Challenging Connections between Settler Colonialism and Heteropatriarchy," *Feminist Formations* 25, no. 1 (2013): 8–34.

¹⁵Fleming, *Meteorology in America*, 126.

¹⁶James Henry Coffin and C. K. Ogden, *Sketch of Professor Coffin: [Anonymous obituary notice]*, 1873.

¹⁷Kohlstedt, 81; Shetterly M. Lee, *Hidden Figures: The Untold Story of the African American Women Who Helped Win the Space Race* (London: William Collins, 2016).

¹⁸On the production of computational skill as a gendered trait in the history of computing, see Abbate, 40.

¹⁹Hoffert, 50.

²⁰"Researches as to the Phenomena of American Storms." *Semi-weekly Eagle*, vol. II, no. 60, 5 Mar. 1849, p. [2].

²¹"Circular on Meteorology," November 1, 1848, Record Unit (RU) 60, Smithsonian Meteorological Project Records, Smithsonian Institution Archives (SIA). Hereafter known as SMPR.

²²SIAR, 1852, 17.

²³SIAR, 1856, 26.

²⁴Fleming, 1990.

²⁵Data collected by author, unpublished.

²⁶Each observer noted here provided letters and data sheets to the Smithsonian Institution. Some of these letters were saved by the various caretakers of the Smithsonian Meteorological Project archival holdings, and can be found in Smithsonian Institution Archives, Record Unit 60 as well as in the National Archives, Record Unit 27.

²⁷Letter from Susannah Spencer to Smithsonian Institution, March 13, 1853, RU 60, SMPR, SIA.

²⁸Letter from Maria Mitchell, September 10, 1855, RU 60, SMPR, SIA. The Smithsonian noted that another letter was received September 19, 1855, but this has not been found. See SIAR, 1869, 75. Henry had known Mitchell and her father since 1848, when Henry agreed to publish Mitchell's paper outlining her comet discovery in the second volume of *Smithsonian Contributions to Knowledge* (see Joseph Henry, Marc Rothenberg, and Kathleen W. Dorman, *The Papers of Joseph Henry Vol. 7* [Washington: Smithsonian Institution Press, 1996] 344, notes 3 and 4). Although Henry supported the publication of Mitchell's discovery, male members of the review board objected, remarking that the "discovery of a New Comet by an American Lady" would not serve to "diffuse in the aggregate a greater amount of knowledge among men, that is *all men*." (Letter dated June 3, 1849, *Joseph Henry Papers*, Vol 8, 544).

²⁹See Kohlstedt, 87.

³⁰Letter from Mary Geoff to SI, RU 60, SMPR, SIA.

³¹Letter from Sara Thomas to Professor Henry, 1859, RU 60, SMPR, SIA.

³²*Meteorological Instruments Loaned, 1850–1870*, 1 volume, arranged by states with an alphabetical index to persons, RU 60, SIA.

³³While Bowen's original letter and drawing have been lost, a secondary note (made by SI) survives in RU 60 today.

³⁴"Records of the Weather Bureau," RG 27 (RG), National Archives at College Park (NARA), College Park, MD.

³⁵Letter from J.S. Bowen to SI, RU 60, SMPR, SIA.

³⁶Letter dated February 21, 1849, RG 27, NARA.

³⁷SIAR, 1869, 75.

³⁸Letter dated February 4, 1850, RG 27, NARA.

³⁹Letter dated September 30, 1851, RG 27, NARA.

⁴⁰Letter dated September 2, 1851, RG 27, NARA.

⁴¹Letter dated January 10, 1852, RG 27, NARA.

⁴²SIAR, 1869, 75.

⁴³SIAR, 1873, 65.

⁴⁴See Fleming, 1990; See also *Joseph Henry Papers*, Vol 9, xx; Henry dismissed Blodget because he had been using incoming volunteer data for his own scientific papers. Henry argued that all incoming data was the property of the Institution and the volunteers who created it and not intended for Blodget's personal use. After notifying Blodget that his services were no longer needed by the Institution, Henry had the locks on Blodget's door changed while Blodget was out to dinner on October 11, 1854.

⁴⁵Virginia Penny, *The Employments of Women: A Cyclopaedia of Women's Work* (Walker, Wise & Company: 1863), 16.

⁴⁶On women gaining admittance through male sponsorship and mentorship, see Hoffert, 49.

⁴⁷Male observers often felt entitled to interpret the data, in addition to observing it. Please see RU 60, SMPR, SIA and RG 27, NARA for evidence of this.

⁴⁸See RU 60, SMPR, SIA and RG 27, NARA.

⁴⁹Letter from Harriet Baer to SI, RU 60, SMPR, SIA.

⁵⁰See letters from September 1858 to early 1859, RU 60, SMPR, SIA especially those of J. D. Parker of Maine, who was sent a brass rain gauge in 1859, and Franklin Fairbanks of Vermont, who corresponded with Henry about an "Equinoctial Storm" in September of 1858.

⁵¹RU 60, SMPR, SIA.

⁵²See RG 27, NARA.

⁵³On the difficulty of recovering "amateur" labor, see Kevin Gotkin. "When Computers Were Amateur," *IEEE Annals of the History of Computing* (IEEE Computing Society, 36 no. 2, 2014): 4–14.

⁵⁴Letter from James Coffin to Joseph Henry, February 25, 1859, James Henry Coffin Papers, RU 7060, SIA.

⁵⁵Census Report, 1857, Northampton County, Easton, PA.

⁵⁶Letter from Coffin to Henry, February 25, 1859, James Henry Coffin Papers, RU 7060, SIA.

⁵⁷See Henry's specification of laborers as "female" in *SIAR* 1857, 28.

⁵⁸See Henry's description of meteorological data labor in the 1856 "Report of the Secretary of the Smithsonian Institution" in *SIAR*. 27–28.

⁵⁹United States, William D. Bishop, Joseph Henry, Franklin B. Hough, and James H. Coffin, *Results of meteorological observations, made under the direction of the United States Patent Office and the Smithsonian Institution from the year 1854 to 1859, inclusive, being a report of the Commissioner of Patents made at the first session of the Thirty-sixth Congress*. (Washington: G.P.O: Patent Office, 1861).

⁶⁰Swanson, 48; Kohlstedt, 89.

⁶¹Joseph Henry Collection, RG 7001, SIA.

⁶²*SIAR*, 1856, 27.

⁶³For the history of data overloads, see Daniel Rosenberg, "Early Modern Information Overload," *Journal of the History of Ideas* (64, no. 1, January 1, 2003), 1–9.

⁶⁴Letter from Coffin to Henry, March 16, 1855, James H. Coffin Papers, 1829–1911, Special Collections & College Archives, Skillman Library, Lafayette College.

⁶⁵Coffin refers to the superintendent as male in his letter.

⁶⁶This portion of Coffin's letter is almost unreadable. The author has tried to the best of their ability to reconstruct this sentence faithfully.

⁶⁷Coffin to Henry, July 12, 1855, RU 7001, Joseph Henry Collection, SIA.

⁶⁸SIAR, 1857, 28.

⁶⁹There is additional evidence that Coffin employed women in the work of reduction. In *The Life of J.H. Coffin*, Coffin's son notes that his father, James Coffin, "engaged the services" of "a considerable number of ladies in Easton" and that "the wages of these computers were paid by a small appropriation from Congress" (65). John Cunningham Clyde, *Life of James H. Coffin, LL. D.: for twenty-seven years professor of mathematics and astronomy in Lafayette College, member of the National Academy of Sciences, and other learned bodies, discoverer of the law which governs the winds of the globe*. (Salt Lake City, Utah: publisher and year not identified).

⁷⁰Reduction was intimately tied to computing at the time. My work takes a wide view of reduction as a computing practice that encompasses nineteenth-century human computing, accounting for people who "reduced or analyzed data using mechanical calculators" as Paul Ceruzzi notes, as well as those who, according to Peggy Kidwell, performed reduction through the use of "reckoning by hand." See P. E. Ceruzzi, "When Computers Were Human," *IEEE Annals of the History of Computing*, (Volume 13, Number 3, 1991): 237; Peggy Aldrich Kidwell, "American Scientists and Calculating Machines—From Novelty to Commonplace," *IEEE Annals of the History of Computing*, (IEEE Computing Society, 12 no.1, 1990): 31–40, 39; and Light, "When Computers Were Women."

⁷¹See SIAR, 1857, 27–28.

⁷²This is the author's own math based on Henry's remarks on yearly totals.

⁷³On the interior cover of Lafayette College's *Results of Meteorological Observations, 1854–1859*—likely given to Coffin by Mason and Henry—is inscribed, "Professor James H. Coffin, LL.D. was for seven years engaged in preparing this volume, 1856–1863. In the compilation, he was aided by twenty students of Lafayette, and fourteen teachers of Easton schools." James Henry Coffin Papers, Lafayette College Special Collections. See also: United States, William D. Bishop, Joseph Henry, Franklin B. Hough, and James H. Coffin, *Results of meteorological observations, made under the direction of the United States Patent Office and the Smithsonian Institution from the year 1854 to 1859, inclusive, being a report of the Commissioner of Patents made at the first session of the Thirty-sixth Congress* (Washington: G.P.O: Patent Office, 1861).

⁷⁴Letter from Coffin to Henry, March 16, 1855, Letters of James Coffin Lafayette College.

⁷⁵In a letter from Coffin to Henry dated March 1, 1855, Coffin proposed the rate of twenty-five cents per hour. This rate was written into the contract that Henry

and Coffin signed on June 15, 1855. Coffin raised the possibility of employing women for this reduction work in a letter later that month, March 16, 1855, and Henry confirmed this in the SIAR of 1856. See also Joseph Henry Papers, Vol. 9, 256–259.

⁷⁶See letter from Mason to Henry, 1855, Joseph Henry Papers.

⁷⁷Leila Sellers, *Commissioner Charles Mason and Clara Barton* (Place of publication not identified: publisher not identified, 1940), 814. Sellers notes that as early as 1848, five temporary clerks were employed on a part-time basis at the Patent Office. Compensation for the year ranged from "\$44.19 to \$174.11," (811).

⁷⁸Percy H. Epler, *The Life of Clara Barton* (New York: The Macmillan Company, 1915), 24.

⁷⁹Elizabeth B. Pryor, *Clara Barton: Professional Angel* (Philadelphia: University of Pennsylvania Press, 1987), 56.

⁸⁰Pryor, *Clara Barton*, 56.

⁸¹Sellers, 813.

⁸²Sellers, 816.

⁸³Quoted in Sellers, from "Miscellaneous letters. Files of the Department of the Interior, Archives of the United States," see 814–816.

⁸⁴Quoted in Sellers, from "Outgoing correspondence of the Secretary of the Interior. Patents and miscellaneous division. Vol. 1, 813.

⁸⁵Swanson, 59. In an 1865 letter to Henry Wilson, Clara Barton reflected on her time at the Patent Office: "You are aware of the fact that I was, among my sex a pioneer in that time having been one of the very first women who ever held such position, and met, and endured whatever of jealous bickerings and malignity grew of such evident innovation upon the customary rights of man. . . . I naturally fell into political disfavor and was early informed that being a 'Black Republican' I was 'disloyal,' and no longer worth the patronage of the government. My books were demanded, three hundred and eighty dollars of undrawn salary withheld from me, on settlement, and I returned to New England to wonder in silence if god ruled or reigned." Letter from Barton to Henry Wilson, December 19, 1865, reel no. 63, The Papers of Clara Barton, LOC.

⁸⁶Swanson, 49.

⁸⁷Swanson, 49.

⁸⁸While Lorin Blodget published what many historians deem the first account by way of his 1857 *Climatology of the United States*, it's important to note that Blodget used Smithsonian volunteer data without crediting the volunteers themselves. Although he referred to the Smithsonian Institution and the geographic distribution of observation locations in his report, he did not credit individual volunteers, nor did he name them. This would not have been a difficult task, as Henry managed

to name, and continue to update observer names, throughout the weather data publications he produced in his tenure as secretary.

⁸⁹Mary Kelley, *Learning to Stand & Speak: Women, Education, and Public Life in America's Republic* (Chapel Hill: University of North Carolina Press, 2008), 7.

⁹⁰Anne Boylan, "Claiming Visibility: Women in Public/Public Women in the United States, 1865–1910" in Janet Floyd, R.J. Ellis, and Lindsey Traub, eds. *Becoming Visible: Women's Presence in Late Nineteenth-century America* (Amsterdam, Rodopi, 2010): 15–40), 21.