

## Evolution and the Natural Order

In 1913, the bohemian journalist Floyd Dell declared “the woman’s movement is a product of the evolutionary science of the nineteenth century. Women’s rebellions there have been before. . . . But it is modern science which, by giving us a new view of the body, its functions, its needs, its claims upon the world, has laid the basis for a successful feminist movement.”<sup>1</sup> To modern readers, this may seem a curious statement. Prominent women’s suffragists did not invoke evolutionary theory very often, and Charles Darwin’s ideas about women, like those of most of his fellow evolutionists, were largely shaped by the ideology of “separate spheres” for men and women that dominated the Victorian era in which he lived. Visionary scientist, yes; feminist, no. Furthermore, since the 1970s, feminist historians have frequently argued that Darwinian evolutionary science, at least as it was articulated in the nineteenth century, should be considered, in the words of one scholar, “intrinsically anti-feminist.”<sup>2</sup> What then could Floyd Dell have meant? This book suggests that Charles Darwin (1809–1882), the most influential evolutionist of the nineteenth (or any) century, did not intentionally upend traditional ideas about gender and sex, but that is precisely what his writings helped to do, as many American women’s rights activists immediately recognized.

For generations, all one needed to know about the proper place of women in American and European society could be gleaned from reading Genesis, which explained that woman was created from man’s rib to be his helpmeet, only to introduce sin into the world and cause the fall of mankind. When women imagined themselves in the world they thought in terms of Eve, and when men had to pinpoint why women could not attend university, minister in church, or participate in public life, they, too, drew on the story of Eve. Adam and Eve provided the script, the images, and

the template for Western ideas about gender until Darwinian evolutionary theory challenged their very existence and made it possible for women and men to imagine alternative origins and a whole new range of gendered possibilities. Furthermore, at exactly the same time that Americans were grappling with evolutionary theory, the burgeoning women's rights movement brought questions of sex difference to the forefront of public debate, making feminism and evolutionary theory concurrent intellectual developments in the transition from the Victorian to the modern era. This historical confluence of events also meant that women and men alike often sought answers to "the woman question" in evolutionary theory.

*From Eve to Evolution* analyzes American responses to evolutionary theory through the lens of gender, and it provides the first book-length study focusing on nineteenth-century women's responses to evolutionary theory. The following chapters pay particular attention to the women, and a few men, who sought to combine their enthusiasm for evolutionary theory with their commitment to women's rights, individuals who might best be grouped under historian Beryl Satter's concept of "reform Darwinists." Reform Darwinists defined themselves as progressive evolutionists, in favor of things such as worker's and women's rights and in opposition to social Darwinists, who tended to support Gilded Age industrial inequities and the status quo.<sup>3</sup> These women, including Antoinette Brown Blackwell, Helen Hamilton Gardener, Eliza Burt Gamble, and Charlotte Perkins Gilman, forged an evolutionary feminism that grappled with questions of biological sex difference, the extent to which maternity did (and should) define women's lives, the equitable division of household labor, and female reproductive autonomy. The practical applications of this evolutionary feminism came to fruition in the early thinking and writing of the American birth control pioneer Margaret Sanger. Much has been written about what Darwin and other male evolutionists had to say regarding women; little has been written about what women had to say regarding evolution.<sup>4</sup> This project is one attempt to add women's voices and a focus on gender to the vast literature on Darwin in America.

Darwin's own views on gender, at least as expressed in his published writings, often rearticulated the dominant, patriarchal views of his era.<sup>5</sup> In the nineteenth century, prescriptive literature and social customs dictated that men inhabit the worlds of commerce, labor, and politics, while women controlled the home, the family's spiritual life, and the children. Such a gendered division of labor was considered natural, civilized, and in accordance with God's will, and, at first glance, Darwin's writings about evolution did little to challenge these long-standing beliefs. Darwin's ideas

regarding sex differences will be explored more fully in subsequent chapters, but, in brief, he explained that, throughout the animal kingdom, the male "has been the more modified" due to the males' having "stronger passion than the females," which tend to retain "a closer resemblance" to the young.<sup>6</sup> Among humans, Darwin believed that "owing to her maternal instincts" woman differs from man chiefly in her "greater tenderness and less selfishness" and lack of intellectual attainments.<sup>7</sup> Overall, Darwin believed that female intellectual inferiority was natural and, most likely, immutable; he imposed Victorian gender roles and mating behavior on animals—combative male insects, strutting peacocks, and coy peahens; and he espoused patriarchal marriage as the epitome of civilization. Such descriptions inspired at least one generation of naturalists to conclude that women's inferiority was a permanent and necessary part of the evolutionary process and a later generation of feminists to reason that evolutionary science was inherently misogynistic.

Yet, Darwin's writings, especially *The Descent of Man, and Selection in Relation to Sex* (1871) and its cornerstone theory of "sexual selection," were multivalent. Even though Darwin and most other nineteenth-century scientists believed that evolution, like Genesis, demanded women's subservience to men and total devotion to maternity, his theory of evolution contained the seeds of radical interpretations as well as conventional ones. Many feminists and other reformers were keen to these revolutionary insights and embraced evolutionary science as an ally. In fact, a generation of freethinking feminists, socialists, and pioneering sexologists all counted Darwin as an intellectual ancestor in the struggle for women's emancipation, as the following chapters demonstrate.<sup>8</sup> To these social radicals, Darwin's two main contributions were freeing men and women from the legacy of Adam and Eve and redefining the "natural" differences between men and women by placing humans in the category of "animals." Each generation defines what is natural in different terms depending on their scientific and cultural contexts; this book tells how a vocal group of reformist women and men invoked Darwinian evolutionary theory to redefine the natural roles for women in the decades between the Civil War and the outbreak of World War I.

## THE DARWINIAN COSMOS

In 1831, young Charles Darwin set out on his legendary five-year long voyage on the HMS *Beagle*. During his many months at sea and in strange lands, he saw creatures, rock formations, plants, and people that would

forever change the way he viewed the world, humans' place in it, and the origins of life on earth. When he relaxed in the evenings or on a slow day, he often read from his favorite book, John Milton's *Paradise Lost*, the epic poem about Adam and Eve's expulsion from the Garden of Eden. Indeed, *Paradise Lost* was the only volume of what might be called "recreational reading" that anyone brought along aboard the *Beagle*.<sup>9</sup> In his book chronicling the *Beagle's* voyage, Darwin recalled, "Milton's *Paradise Lost* had been my chief favourite, and in my excursions during the voyage of the *Beagle*, when I could take only a single small volume, I always chose Milton." To ensure that he could take *Paradise Lost* with him wherever he went, Darwin even had a special pocket sewn into his coat to hold his pocket-sized edition. Darwin memorized large sections of the poem and sometimes referred to it in describing the many breathtaking things he saw on his voyage, such as the view from the *Beagle* as it approached Buenos Aires: "As far as the eye reached, the crest of every wave was bright; and from the reflected light, the sky just above the horizon was not so utterly dark as the rest of the Heavens.—It was impossible to behold this plain of matter, as it were melted and consuming by heat, without being reminded of Milton's description of . . . Chaos and Anarchy."<sup>10</sup> As Darwin imagined the world of Adam and Eve, little did he know that he would soon introduce an alternative creation story and a brand new way to understand humans' place in the universe.

In *On the Origin of Species by Means of Natural Selection, or the Preservation of Favoured Races in the Struggle for Life* (1859), Darwin cast doubt on the Genesis version of creation, and in *The Descent of Man* he shifted scientific and popular attention away from divine creation and toward a naturalistic explanation of all forms of organic life, including humans. In addition to incorporating humans into the evolutionary saga, *The Descent of Man* also introduced the theory of sexual selection, which Darwin believed explained the differences between men and women, as well as the evolution of heterosexual reproduction. Taken together, Darwin's work helped to usher in a new, evolutionary cosmology based not on special creation and original sin but on individual fitness, reproductive success, and human-animal kinship. Also central to the Darwinian cosmology were the twinned concepts of constant change and unlimited variation—no species was fixed, and the natural world was a wondrous place, subject to all sorts of changes over time. The Darwinian shift to thinking about the world in naturalistic, as opposed to divine, terms had important implications for scientific and popular understandings of gender and sex.

Scientific and cultural debates about evolutionary theory, by definition,

invoke larger existential questions: What is the meaning of life? What is humans' place in the universe? What is the natural order of things? Such debates often hinge on, and reflect, ideas about gender. In the nineteenth century, evolutionary theory offered radically new ways to think about the differences between men and women, the function of sexual dimorphism, and the mores governing heterosexual relations (because Darwin focused on the reproductive aspects of sex, his works assumed heteronormativity, although some contemporary readers did see in evolutionary theory the opportunity to make new arguments supporting the "naturalness" of the variety of sexual behaviors found in the animal kingdom and among humans).<sup>11</sup> As a result of evolutionary theory's implications for gender and sex, responses to it were often highly gendered as readers interpreted Darwinian evolution according to whether or not it supported what they believed to be true, or hoped could be true, about men and women.

Popularly accepted views regarding what is natural have particular resonance for questions about gender and women's rights, as the historian of science Londa Schiebinger and others have established.<sup>12</sup> In democratic governments founded on the principle of "natural rights," the political world is supposed to mirror the natural, so what people accept as evidence from nature shapes political, cultural, and personal realities. In the nineteenth century, evolutionary theory did not create new bodies for men and women or offer concrete, unassailable revelations about existing ones, but it did redefine what it meant to be human, and it rephrased questions regarding sexual difference, thereby reframing debates about the rights of men and women. In a Darwinian world, all organisms were not created equally, and it was these subtle differences between individuals that determined who lived long enough to reproduce. Moreover, Darwin described the differences between males and females, especially in *The Descent of Man*, as engines of evolutionary development and hallmarks of advancement. As Darwin explained, sexual dimorphism enabled the evolution of higher animals because it multiplied the possible variations that offspring could inherit, and males were the ones chiefly modified as they participated more fully in the struggle for existence. In his summary of secondary sexual characters in humans, Darwin explained, "We may conclude that the greater size, strength, courage, pugnacity, and even energy of man, in comparison with the same qualities in woman, were acquired during primeval times, and have subsequently been augmented, chiefly through the contests of rival males for the possession of the females." According to Darwin, men's brains had been modified along with their bodies: "The greater intellectual vigour and power of invention in man is probably due

to natural selection combined with the inherited effects of habit, for the most able men will have succeeded best in defending and providing for themselves, their wives and offspring."<sup>13</sup> While such statements tended to affirm Victorian ideas about male superiority, keen readers recognized that the shift in base from divine creation to naturalistic evolution and from faith to scientific observation might offer women new possibilities.

The fundamental question, heightened in urgency by Darwin but certainly not introduced by him, was what, if any, lessons about humans could be learned from animals. Thinkers as far back as Aristotle had understood that humans bore obvious structural and other similarities to animals, but Darwin was the first to plausibly propose that neither animals nor humans were specially created by God and that they might in fact be more alike than different. In *The Descent of Man* and his later work, Darwin went so far as to argue that all human traits—including even the ability to reason and express emotions—could be observed among animals and explained by natural and sexual selection, with no help from a divine creator.<sup>14</sup> To Darwin, the central point was not that humans had evolved from animals; it was that humans *were* animals. Later critics have rightly criticized Darwin for imposing Victorian cultural prejudices on the animals and plants he described, but, as George Levine has suggested, perhaps the most accurate word to describe Darwin's philosophy is not anthropomorphism but zoomorphism.<sup>15</sup> By insisting that all human traits could be found to some degree in animals, Darwin stressed the animal nature of humans, not vice versa.

The publication of Darwin's landmark works was not the first time, and surely it will not be the last, that science has provided the impetus for a broad-based rethinking of what it means to be human, male and female. In the seventeenth and eighteenth centuries, the enterprise of modern science itself was constructed along highly gendered lines.<sup>16</sup> Darwin and his contemporaries were, in many ways, the products of this Enlightenment science, and "science" as it came to be practiced and institutionalized in Darwin's era developed along highly gendered and exclusionary lines, as subsequent chapters attest. Darwin was also not the first person to posit the evolution of species, or transmutation as it was then called. His own grandfather, Erasmus Darwin (1731–1802), proposed evolutionary ideas in his canonical and idiosyncratic *Zoonomia* (1794), and the French evolutionist Jean-Baptiste Lamarck's (1744–1829) ideas about the inheritance of acquired characteristics remained popular in Europe and America into the twentieth century. In the United States, Herbert Spencer's "social Darwinism" was equally, if not more, influential than the more naturalistic

Darwinism, especially because it appealed to American's abiding faith in progress and because it did not directly challenge special creation.<sup>17</sup> Spencer aimed to provide one unifying theory, his "synthetic philosophy," for the evolution of everything organic and inorganic—including culture, economic systems, and human societies—that continuously improved toward perfection and was not necessarily based in scientific evidence or observation. Furthermore, among the scientific community at the turn of the twentieth century, as the historian of science Peter Bowler has established, there were actually many competing theories of evolution that rivaled Darwinian natural selection as the most viable explanation of change over time.<sup>18</sup>

Despite the many varieties of evolutionary theory that circulated in the Gilded Age, there was something highly distinctive about the work of Charles Darwin and its American reception, as has been well documented by the legions of Darwin scholars.<sup>19</sup> First, unlike previous scientific attempts to describe the evolution of species, Darwin proposed two viable mechanisms, natural selection and sexual selection, that could have caused such dramatic changes over millions of years. Second, unlike Spencer and the many other popular social evolutionists, Darwin grounded his theories in rigorous scientific observation and experimentation, and they have, by and large, turned out to be accurate. Third, and perhaps most important for the purposes of this study, unlike his predecessors or his contemporary social evolutionists, Darwin fundamentally redefined nature by severing it from an omniscient creator and by placing humans in the animal kingdom.<sup>20</sup> To him, human kinship with animals was so patently obvious that, as he wrote in *The Descent of Man*, "It is only our natural prejudice, and that arrogance which made our forefathers declare that they were descended from demi-gods, which leads us to demur to this conclusion."<sup>21</sup> To date, most historical scholarship on Darwin has focused on the *Origin of Species* and the theory of natural selection. Yet the reception of *The Descent of Man* and the theory of sexual selection are equally rich and deserving of analysis, as a small but growing body of literature has demonstrated.<sup>22</sup> In addition to a focus on women and gender, *From Eve to Evolution* adds much needed attention to the American reception of *The Descent of Man*.

#### THE GENDERED RECEPTION OF *THE DESCENT OF MAN*

For modern readers to appreciate the gendered significance of Darwinian evolution, imagine what it would be like if scientists today discovered life



on another planet that was either sexed differently than humans or not sexed at all. What if extraterrestrial organisms had several sexes, or none at all? What if they reproduced asexually, or homosexually, or both? Might this shed light on current debates about the extent to which biology determines sex and sexuality? In other words, what would happen if what the majority of Americans consider to be the natural order of things—namely, fixed gender and sexual categories—was not preordained or natural after all? Perhaps this was the sort of shock experienced by men and women in the nineteenth century whose interpretation of Darwinian evolutionary theory forced them to reconsider time-honored, biblical prescriptions for male and female behavior, marriage, and reproduction.

In the *Origin of Species* Darwin argued that all species had evolved gradually from a common ancestor, most likely a single-celled hermaphroditic organism, through the process of natural selection whereby those individuals who were the best adapted to their environment would be more likely to survive and pass on their traits to offspring. Darwin only hinted at the ways in which his theory might pertain to humans, famously noting in the concluding pages that one day “light will be thrown on the origin of man and his history,” although most of his readers immediately grasped the implications.<sup>23</sup> For one thing, if one accepted Darwin’s creation story, there was no such thing as the Garden of Eden, a possibility of particular interest to women’s rights activists.

In *The Descent of Man*, Darwin applied evolutionary theory specifically to humans. In response to tremendous pressure from his peers—critics and supporters alike—Darwin’s initial goals in writing about human evolution were to explain the divergence of races and the existence of sexual dimorphism. As he continued to compile his notes and thoughts regarding human evolution, however, Darwin realized he would also need to tackle the development of human intellect and morals in order for his completely naturalistic explanation of evolution to be convincing.<sup>24</sup> Such a task proved challenging and often led Darwin to contradict himself as he attempted to construct an evolutionary path, albeit a winding and hesitant one, from protozoa to modern human civilization that explained not only the origin of human life but also its customs and cultural achievements. The mechanism responsible for many of these developments, according to Darwin, was “sexual selection.”

Darwin first grappled with sexual selection in unpublished writings from the 1840s, and he alluded to the theory in the *Origin of Species*. There he defined sexual selection not as “a struggle for existence” but as “a struggle between the males for possession of the females,” a sort of cor-

ollary to natural selection. He claimed that sexual selection accounted for differences in “structure, colour, or ornament” in species where the males and females “have the same general habits of life.”<sup>25</sup> But he devoted just two pages to sexual selection. In the years between the publication of the *Origin* and the *Descent*, he continued to puzzle over the persistence of maladaptive traits, traits that conferred no survival advantages to their possessors and, thus, could not be explained by natural selection. Why had traits, such as the peacock’s bright plumage, survived?

In *The Descent of Man*, Darwin concluded that maladaptive traits continued to be passed on to future generations simply because the opposite sex found them attractive, thereby increasing the odds that the peacock with the most brilliant plumage, for example, would leave many offspring. The persistence of traits that “must be slightly injurious to the male” convinced Darwin that “the advantages which favoured males . . . leaving numerous progeny, are in the long run greater than those derived from rather more perfect adaptation to their conditions of life.” As a result of this revelation, Darwin came to believe that the struggle to reproduce was at least as important, if not more important, than the struggle to survive. This realization seemed to have surprised even Darwin. “It could never have been anticipated,” he confessed, “that the power to charm the female has sometimes been more important than the power to conquer other males in battle.”<sup>26</sup> Most nineteenth-century naturalists rejected sexual selection theory, but, in the years before his death, Darwin became only more convinced of it. In a letter read before the Zoological Society of London in 1882, just hours before his death, Darwin once again affirmed his belief in sexual selection: “I may perhaps be here permitted to say that, after having carefully weighed, to the best of my ability, the various arguments which have been advanced against the principle of sexual selection, I remain firmly convinced of its truth.”<sup>27</sup>

Darwin clarified that sexual selection applied only to instances in which males and females of the same species were exposed to the same conditions and had the same habits, yet one sex, usually the male, had very distinctive traits compared with those of the female to whom he displayed these distinctive traits. Males, for example, often exhibited inordinately brilliant feathers or large tusks, which Darwin reasoned must have appealed to the females, otherwise there would be no adaptive reason for their existence. As one sex (usually the female) repeatedly selected for the desired traits in the other (usually the male), the sexes would differentiate from each other and the desired trait would be passed on to the next generation and exaggerated over time. The two main tenets of sexual selection

theory then were male battle and female choice of sexual mates; however, Darwin asserted that among humans, men, not women, selected mates, an observation that puzzled many nineteenth-century reformers because it seemed to contradict Darwin's otherwise firm belief in the animal-human continuum. Darwin's description of mate selection also forced people to examine heterosexual desire in evolutionary and naturalistic terms by suggesting that reproductive choices shaped the evolutionary process, positing links between human desire and animal mating, and proposing that science might help us better understand sexuality and reproduction.

Even though many naturalists remained skeptical of sexual selection theory until the late twentieth century, *The Descent of Man* reverberated widely throughout transatlantic scientific and popular circles. Referring to the theory of sexual selection, the *New York Times* reported, "nothing that Darwin has written is so ingenious or suggestive than the long, minute, and careful investigation in this field."<sup>28</sup> Much to Darwin's surprise, this book did not garner, on either side of the Atlantic, nearly the amount of criticism that had greeted the *Origin of Species*. He mused, "everyone is talking about it without being shocked."<sup>29</sup> Other scientists also noted the equanimity that greeted the *Descent*. Shortly after its publication, Darwin's ally Joseph Hooker informed him, "I dined out three days last week, and at every table heard evolution talked of as an accepted fact, and the descent of man with calmness."<sup>30</sup> One literary notice observed "the very general discussion by the press of Darwin's 'The Descent of Man' has, instead of exhausting public interest in this latest scientific question, greatly stimulated it. The sale of Darwin's work is almost unprecedented in scientific literature."<sup>31</sup> Just a few weeks after the first U.S. editions of the *Descent* hit the stands, Edward L. Youmans, publisher of *Popular Science Monthly*, wrote to Herbert Spencer, "[T]hings are going here furiously. I have never known anything quite like it. Ten thousand *Descent of Man* have been printed, and I guess they are nearly all gone."<sup>32</sup>

Regardless of whether or not readers accepted Darwin's arguments in *The Descent of Man*, all agreed that the book was a literary sensation and a must-read. Even the negative reviews suggested that people read the *Descent*. In its signature ladylike tone, *Godey's Lady's Book*, the popular nineteenth-century women's magazine, noted that the book "will call forth discussion and dissent among the masterminds of the age" but demurred in conclusion, "we are not yet an avowed convert to Darwin's theories, but we find his book exceedingly interesting."<sup>33</sup> The *Galaxy* proclaimed, "[W]hatever may be thought of Mr. Darwin's conclusions as to the origin of man, his book will be found a rich mine of facts, entertaining and curi-

ous on the highest questions of natural history."<sup>34</sup> *Old and New* declared the *Descent* to be "as exciting as any novel."<sup>35</sup> *Appleton's* announced that the book was the literary sensation of the month, while *Harper's* observed that "few scientific works have excited more attention" than the *Descent* as evidenced by the fact that one could not open a magazine without reading about it.<sup>36</sup> It appeared on prominent book lists for women's and girls' clubs until the turn of the twentieth century, and the *New York Times* reported that it was among the most popular books checked out of Manhattan public libraries as late as 1895.<sup>37</sup>

While American reviews of the *Descent* often critiqued Darwin's assertion that humans were not specially created by God, several also betrayed a gendered subtext, especially as they tried to make sense of sexual selection. *Overland Monthly* printed the most in-depth analysis of sexual selection in the article "The Darwinian Eden." This review did not so much critique the theory as argue that it could not possibly be a factor in modern society where "the most likely young fellow that ever trod the earth does not stand the ghost of a show beside the rich man, though the latter should be humped as to his back, gnarled and twisted as to his limbs, lean, withered, and decrepit."<sup>38</sup> Other publications took a more circumspect approach to this new theory of sex. *Appleton's* thoroughly explained sexual selection in two consecutive articles but discussed its applications only in relation to birds.<sup>39</sup> "We scarcely know how to deal with Sexual Selection . . . It is both a delicate and a difficult subject, and cannot be discussed within moderate limits," declared the *Albion* before fairly summarizing the theory's main points.

Visual images also presented interesting commentaries on gendered interpretations of *The Descent of Man*. *Harper's Bazaar* published two cartoons in response to the publication of this watershed work. In the cartoon "A Logical Refutation of Mr. Darwin's Theory," a husband read passages from the *Descent* to his wife "whom he adores, but loves to teaze [sic]." In the illustration (fig. I.1), the bearded husband kneeled in front of his wife in their well-appointed Victorian parlor and read to her while she cuddled their baby. The wife, however, rejected the assertion that their baby was "descended from a Hairy Quadruped with Pointed Ears and a Tail." "Speak for yourself, Jack! I'm not descended from anything of the kind," she responded. "I beg to say, and Baby takes after Me. So there!"<sup>40</sup> The accompanying illustration depicted the wife as decorous and civilized, the epitome of nineteenth-century femininity. While bearded, brute man could perhaps have evolved from ape-like progenitors, his refined wife most certainly did not. The second cartoon, "The Descent of Man," played on both racial and



Figure I.1. "A Logical Refutation of Mr. Darwin's Theory," *Harper's Bazaar*, May 6, 1871, p. 288. Reproduced from the Collection of the Public Library of Cincinnati and Hamilton County.

gendered anxieties (fig. I.2). The "figurative" man asked the "literal" man why he should care whether or not he was descended from an "Anthropoid Ape," so long as he himself was a man. The literal man, who had simian facial features and who was depicted as speaking in dialect, responded, "Haw I wather disagreeable for your *Guate-Gwandmother*, wasn't it?" ["How I rather disagreeable for your great grandmother?"]<sup>41</sup> Again, the message was clear: women could not have descended from apes, and no civilized woman would have sanctioned sex with a prehuman ancestor.

Literature, too, provides a window into the gendered reception of *The Descent of Man*. Much turn-of-the-century fiction, notably the work of Kate Chopin, was strongly influenced by *The Descent of Man*, and several other works mentioned the book directly.<sup>42</sup> In her novel *My Wife and I*,

or *Harry Henderson's History* (1871), Harriet Beecher Stowe used sexual selection to grapple with the challenges of courtship and the limited roles for women in the nineteenth century. In an attempt to distract herself from obsessing over Harry Henderson, a love interest, Eva sat down to read her friend Ida's copy of *The Descent of Man*, only to open right to the section on sexual selection, at which point she exclaimed, "Oh horrid!" Far from diverting her from thoughts of Henderson, reading about sexual selection only exacerbated her preoccupation. Ida, her proudly single and



Figure I.2. "The Descent of Man," *Harper's Bazaar*, June 28, 1873, p. 416. Reproduced from the Collection of the Public Library of Cincinnati and Hamilton County.

academically oriented friend, encouraged Eva to remain open-minded and read the book for herself, noting that the main reason she could think only of Henderson was that she had nothing else to do.<sup>43</sup> Like the women chronicled in this book, Ida was keen to the new possibilities for gender and sex latent in a progressive interpretation of *The Descent of Man*. In a visual representation of women like Ida, the *Philadelphia Inquirer* ran a cartoon titled "The New Woman Speculating on the Descent of Man," featuring three well-dressed ladies admiring a monkey in a cage, intimating that new women and the acceptance of evolutionary theory went hand-in-hand, perhaps at the expense of traditional male roles.<sup>44</sup> Indeed, for nineteenth-century Americans, the phrase "sexual selection" and the title "The Descent of Man" often functioned as shorthand for new ideas about gender and courtship.

That individuals were keen to the gendered ramifications of evolutionary theory was particularly evident in spoofs parodying *The Descent of Man*. One of the most popular was a song, to the tune of "Greensleeves," first published in *Blackwood's Edinburgh Magazine* and reprinted in numerous U.S. periodicals. Among the "very queer things" that happened as humans descended from animals was that "women plainly had beards and big whiskers at first; While the man supplied milk when the baby was nursed; And some other strong facts I could tell—if I durst—Which nobody can deny."<sup>45</sup> Darwin's suggestion that all organic life had descended from a single-celled hermaphroditic organism troubled some men and women raised on the doctrine of separate spheres and the related idea that, physiologically, women were entirely distinct from men. To others, however, the possibility of a hermaphroditic past sounded exciting and opened up a new world of gendered possibilities.

Perhaps the most colorful response to *The Descent of Man* was the satire entitled *The Fall of Man: Or, the Loves of the Gorillas*, published anonymously by the literary critic and essayist Richard Grant White. Billed as "A popular scientific lecture upon the Darwinian Theory of Development by Sexual Selection, By a Learned Gorilla," this spoof focused on Darwin's assertion that female choice had determined the evolution of species.<sup>46</sup> The "learned gorilla" held a public lecture to explain to his neighbors how their distant cousin had "descended from monkey-hood to humanity." Harkening back to the Genesis creation story, the narrator began by pointing out that, much like humans, monkeys had "fallen" through "the frailty and fickleness of the female sex."<sup>47</sup> In contrast to the biblical account of the fall through female curiosity, gorillas fell through female choice. Once upon a time, the speaker explained, a beautiful female gorilla did not like

any of her suitors and refused to be captured. Then one day, she spied a sea serpent, fell instantly in love, and selected him as her mate of choice. Their offspring had tails, and soon tails became a highly desired trait. Subsequently, a whole generation of gorillas with tails evolved. At first gorillas welcomed this development, but the tail kept growing and soon became a tripping hazard. "In this deplorable condition of affairs, we were saved by the action of the same great principle of sexual selection to which we owed our degradation. By a female came our fall, and through a female came our salvation," reported the narrator. Another young gorilla married a tailless hippopotamus and thus reversed the trend for tails. Many generations later, a female resolved to marry a mutant, hairless gorilla, who refused to show interest in any females with hair. Desperate for his attention, she adhered herself to a gum tree for an improvised body wax and, ultimately, gained his affections. In turn, the hairless male gorilla encouraged his other female suitors to remove their hair in the same fashion, and, through these hairless pairings, man evolved from gorilla.<sup>48</sup>

Close analysis of the U.S. reception of *The Descent of Man* reveals the varied ways in which women and men responded to, and in many cases reformulated, Darwin's theory of sexual selection. For those readers who were already inclined to challenge the existing order, Darwin provided the scientific justification to question whether or not patriarchy, monogamy, and female domesticity were in fact natural when so many alternative domestic and sexual arrangements could be found in the animal kingdom. Sexual selection theory also introduced the provocative and potentially radical concept of female choice of sexual partners, providing attentive readers with a new way to think about sexual relations and power systems. Indeed, perhaps the most notable aspect of the American reception of *The Descent of Man* is that so many women enlisted it for feminist purposes.

## WOMEN RESPOND TO DARWIN

Between the 1870s and the 1890s—before the transition to a professional, masculinized science was completed, and before the organized women's rights movement contracted to focus on the vote—an influential group of women spoke and published on the feminist applications of evolutionary theory.<sup>49</sup> Like most nineteenth-century Americans, these women often blended the ideas of Darwin, Spencer, Lamarck, and other evolutionists, often without discerning the differences between them and often referring to all evolutionary ideas as "Darwinian." At the same time, scientists vigorously debated what exactly defined Darwinism, and, today, histori-

ans of science continue to wrestle with who, at any given moment, should be considered a Darwinist.<sup>50</sup> In my analysis of the scientific ideas women discussed, I am careful to delineate how these ideas relate to Darwin and attempt to keep the focus on Darwinian ideas, especially sexual selection theory, but I did not preclude from my study sources who wrote about Darwin in ways that were not true to the letter of his word or sources that, for example, blended the ideas of Darwin and Spencer. Doing so would eliminate most nineteenth-century Americans' responses to evolutionary theory.

The women chronicled in this book also tended to be white, middle or upper class, educated, and either unconventionally religious or out-right atheists. Although they did not represent a broad swath of American women, they published widely, held powerful posts, and influenced their peers beyond what their numbers might suggest. These Darwinian feminists (my phrase, not theirs) welcomed the entry of science into discussions of women's rights because they thought science provided a better forum than religion to debate sex differences and because they trusted that science could be impartial, even though it often was not.<sup>51</sup> In fact, in their writings, they all compared the Genesis creation story to Darwinian evolution in explaining their preference for evolution. Nineteenth-century Darwinian feminists crafted a compelling case for the feminist applications of evolutionary science and for a feminist approach to biological sex differences, although most of their ideas ultimately fell on deaf ears as women's rights activists shifted to focus exclusively on the vote and as professional science increasingly excluded women. Their writings tell us about the development of "science" as a type of cultural capital and raise important questions about the construction of scientific authority in the nineteenth century. Furthermore, a study of women's enthusiastic responses to Darwin sheds new light on the popularization of evolutionary science in the United States and on the variety of meanings eager readers placed upon this new science.<sup>52</sup>

As readers pondered Darwin's works, the academic departments, institutions, and governmental agencies that today we think of as "science" were all developing. Thus, just as the term "woman" was in flux at the close of the nineteenth century, so, too, was the term "science." Darwin and Darwinian evolution helped shape the development of modern science because his theories popularized the potential of scientific inquiry and inspired public debate about what exactly counted as science, a field that had previously been considered in line with Christian teachings. The women studied in this book did not, for the most part, have access to scientific

training or credentials, yet they eagerly read the latest scientific works and believed they were contributing to scientific knowledge. They carved out spaces for themselves to participate in science through women's clubs, which often held discussions of science or sponsored special subgroups on science; through popular magazines that welcomed scientific musings (especially *Popular Science Monthly*); and through the lecture circuit. Their writings document that the exclusion of women from professional science was highly contested and remind us that this historical exclusion continues to have important ramifications for both women and science.

Even though women were, for the most part, excluded from the institutionalization of science, they, too, were inspired by Darwin, especially his materialistic explanation of organic life and his suggestion that humans might be able to learn about themselves from animals. Then, as now, such ideas were difficult to accept even for the most rational, forward-thinking individuals, who were, nevertheless, raised on the twinned concepts of special creation and human distinctiveness. But it was this naturalistic worldview that offered the biggest break from tradition and provided among the most interesting innovations in feminist thought at the turn of the twentieth century. As debates about women's rights increasingly depended on scientific evidence, women frequently used this to their advantage by countering science with what they believed to be better science and by entering the evidence of their own experiences into the scientific record.<sup>53</sup> Evolutionary science was an unlikely and unwitting ally in the struggle for women's rights. Nevertheless, it allowed women to contemplate a world free from gendered biblical restrictions; to ponder sex differences in terms of animals, variety, and change; and to reimagine their bodies and their role in reproduction in an evolutionary, as opposed to biblical, context. From Darwin's example, the women studied in this book also learned to distrust dogma, tradition, and orthodoxy and, instead, view the world around them with a fresh, critical eye and demand verifiable evidence for all supposed truths.

By foregrounding the role that time-honored religious strictures played in motivating the Darwinian feminists and by synthesizing the ways that women interpreted evolutionary science for feminist purposes, *From Eve to Evolution* adds a fresh perspective to existing work on nineteenth-century science and gender, which has tended to focus on the antifeminist uses of science.<sup>54</sup> Feminist historians and philosophers of science have called on historians to recover women's scientific activities in order to help us better understand the construction of science and identify alternative definitions of science. The physicist and historian of science Evelyn

Fox Keller, for example, asserts that the first task of a feminist critique of science is historical: "In the historical effort, feminists can bring a whole new range of sensitivities, leading to an equally new consciousness of the potentialities lying latent in the scientific project."<sup>55</sup> The women studied in this book reveal the latent "potentialities" in sexual selection theory, as well as demonstrate that women, too, were actively engaged in the creation of the American scientific establishment, even as this establishment subsequently excluded them.

The Darwinian feminists also have something important to tell us about the relationship of women to evolutionary science in particular. While for much of the twentieth century many feminists considered evolutionary science to be antithetical to women's advancement, a growing number of scholars now urge a reconsideration of what evolutionary science might mean for women. Feminist theorist Elizabeth Grosz, for example, has encouraged modern feminists to revisit evolutionary theory because "the Darwinian model of sexual selection comes to a strange anticipation of the resonances of sexual difference in the terms of contemporary feminist theory! It provides the outline of a nonessentialist understanding of the (historical) necessity of sexual dimorphism."<sup>56</sup> In *The Nick of Time: Politics, Evolution and the Untimely* (2004), Grosz critiques "the standard, knee-jerk feminist reading of Darwin today . . . [that] he sometimes sounds suspiciously like an apologist for his own culture's masculine privilege," and instead suggests that feminists, and others, look to Darwin's "reconfiguration of culture in light of the fundamental openness he attributes to the natural world." She further proposes that Darwinian evolutionary theory "may be of use to a feminist politics of transformation, which may find his conceptions of time and becoming helpful in rethinking concepts of nature and culture, of human and animal, mind and matter, outside their more conventional feminist frameworks."<sup>57</sup> The nineteenth-century feminists studied in *From Eve to Evolution* were drawn to evolutionary theory because it naturalized a world based on variation and change, established a line of continuity between animals and humans, and probed the boundaries between nature and culture and because they, too, saw in it the potential for nonessentialist, nonreductive accounts of sex difference. Their critical eye toward scientific sexism, however, did not tend to be accompanied by a critical eye toward scientific racism. Like most feminist thought of the time, the Darwinian feminists' ideology was grounded in assumptions of whiteness and, generally, white racial superiority.

Indeed, racial thinking underlies many of the Darwinian feminists'

responses to evolutionary theory, as well Darwin's own ideas about gender. In *Darwin's Sacred Cause* (2009), Darwin scholars Adrian Desmond and James Moore persuasively argue that Darwin's strident objection to slavery compelled the publication of *The Descent of Man* and that race was a central concern of the book. Specifically, they contend that Darwin set out to prove, once and for all, that all humans evolved from a common ancestor, a theory called monogenesis. At the time, the more popularly accepted view among scientists and laypeople was polygenesis—the idea that each race sprang from a separate ancestor and should thus be viewed as separate species.<sup>58</sup> Polygenesis was often invoked in defense of slavery, and Darwin found the concept absurd and dangerous. To explain how the various races, often very different in appearance, had evolved from one common stock, Darwin invoked the theory of sexual selection and suggested that each race held a distinct standard of beauty. As men in each race selected mates that best exemplified their specific racial tastes, the races diversified and became more distinct over time.<sup>59</sup> To Darwin and his readers, race, gender, and sex were intimately intertwined from the beginning. While Darwin took great pains to establish the common humanity of all people and protested the most virulent forms of racism of his day, modern readers have rightly noted that, nevertheless, racial hierarchies populate Darwin's evolutionary narrative as humans ascended from "savage" (generally brown) to "civilized" (generally white). The women who were most enthused by Darwinian evolution, as previous scholars have established, also internalized these racial hierarchies and often drew on them to assert that their rightful place was at the top of the evolutionary ladder, together with white men.<sup>60</sup> These racialized assumptions severely limited the radical potential of the Darwinian feminists' critiques of their society, but they are not the only aspect of this story.

Modern scholars debate the extent to which these women's feminist ideals were grounded in assumptions of white superiority and what this means for our interpretation of them today. Among the Darwinian feminists discussed in this book, charges of racism particularly pertain to the writings of Charlotte Perkins Gilman and Elizabeth Cady Stanton. Some scholars, most notably Louise Michele Newman in *White Women's Rights: The Racial Origins of Feminism in the United States* (1999), have argued that evolutionary discourse encouraged latent racist tendencies in the nineteenth-century women's rights movement and that racism is the main legacy of the era's feminist thought. Likewise, literary scholar and cultural critic Alys Eve Weinbaum has suggested that feminists jettison, at least in part, Charlotte Perkins Gilman owing to the racist themes in



her work.<sup>61</sup> Other historians, including Judith Allen and Ann D. Gordon, have argued that we should view the Darwinian feminists—in this case Gilman and Stanton, respectively—in historical context and recognize that, for their time, these women were not, in fact, racist compared with the rest of society or even with their reformist peers. They further suggest that even as modern scholars rightly reject the racial undertones of Gilman's and Stanton's work and their assumptions of white racial superiority, we should not dismiss their important contributions to American feminist thought.<sup>62</sup> Moreover, Allen contends that recent critical efforts to dismiss Gilman as "racist" are "not only unhistorical but also antihistorical when its [the Gilman-is-racist school of thought] advocates reject the historian's mission of investigating transformation over time and situating evidence in its own historical context."<sup>63</sup> Taken together, Gilman and the other Darwinian feminists tended to articulate the dominant racial hierarchies of their time and to lobby for reforms that would mainly benefit white women like themselves, sometimes at the expense of people of color. While modern readers recognize the connections between gendered and racial oppression and the ways in which racial ideologies structure gendered ones, and vice versa, it would be ahistorical to discount the contributions of Darwinian feminists because they did not.

Following the examples of Judith Allen, Ann D. Gordon, Michele Mitchell, and others, my work recognizes the racialized thinking among the Darwinian feminists—especially in the places where it is most overt, as in their support of "educated" (read white) suffrage—and seeks to place it in the broader context of their evolutionary and feminist thinking and in the broader historical context in which they wrote. A main contribution of this book is to place religion, science, and gender in conversation with each other, in an attempt to mirror the milieu in which these women interpreted evolutionary theory. As a result, I suggest that their deep frustration with Christian ideology based on Eve, not their internalized racial hierarchies, primarily motivated many women to enlist Darwinian evolution. Furthermore, my research reveals that the Darwinian feminists did not articulate a unified idea of race. The women studied in this book did not all think the same things with regard to race, either as each other or over the course of their long careers. Many of them, especially Antoinette Brown Blackwell, Eliza Burt Gamble, and Margaret Sanger, were particularly concerned with the plight of poor women, who were more likely to not be white, and hoped their visions of reform would especially benefit them.

In addition, the Darwinian feminists pioneered strategies to critique science, reformulate the production of scientific knowledge, and make the

scientific enterprise more inclusive, techniques that, ultimately, could be enlisted by other marginalized groups as well. For example, by suggesting that the cultural and the natural were fundamentally intertwined and open to constant variation, Darwinian feminists helped craft the arguments against biological determinism and biological hierarchies, not just for white women but for everyone. Thus, this book suggests that we pay particular attention to the nuanced and complex ways that the Darwinian feminists articulated ideas about sex and race within the broad context of their experiences and their historical realities.

To that end, this study seeks to understand the Darwinian feminists not only in historical context but also in their personal circumstances. Key to such an approach is appreciating the parameters and major events of the women's lives as they lived them. What concerns did they have as women, mothers, and wives? How did these day-to-day, lived realities shape their understanding of evolutionary theory as well as what they hoped evolution might mean for women and men in the future? The women studied in this book had much in common. First, they were all white and middle or upper class, at least in terms of ideology if not always financially, and several were members of the most prominent families in nineteenth-century America. Because of the racism within the women's rights movement, and within mainstream America more generally, African American women did not generally have the opportunity to publish in the women's rights, reform, or scientific periodicals that provide the basis for much of this study, and, subsequently, their voices are largely absent from this work as well. To my knowledge, there are no studies of African American women's responses to evolutionary theory, and I heartily look forward to work in this vein.<sup>64</sup> In addition to shared racial and class perspectives, the women in this book considered themselves working mothers, or at least working wives, which put them in a tiny but growing minority of white, middle-class American women. Educated, high achieving, and ambitious, they each hoped to leave a lasting mark on the world, but they were not sure how, or even if, it would be possible to balance their professional goals with the domestic responsibilities expected of them as women, wives, and mothers. Thus, a common thread that runs throughout their writing—and why they were so intent on looking to animals for alternative domestic models—was the argument that it was natural for women to work outside of the home. They did not agree on how exactly women might do this—have many children, few children, or no children, helpful husbands, no husbands, cooperative domestic arrangements, or professional housekeepers—but they all believed that the progress of women was deeply inter-

twined with the advance of science and that, in the future, science would enable women to contribute in all realms of life.

## CHAPTER OVERVIEW

Chapter 1 sets the tone for the rest of book by demonstrating how central Eve was to debates about women's rights and why many women eagerly referenced evolutionary theory in general and *The Descent of Man* in particular as an alternative creation story. Ultimately, Darwinian evolution inspired some freethinking (a nineteenth-century term referring to agnostics and atheists) feminists to renounce Eve and Christian orthodoxy all together, forcing a split in the women's rights movement. The women most influenced by Darwinian evolution were, more or less, ousted from the largest suffrage organization, the National American Woman Suffrage Association, partially as a result of their divergent views about the role that religion should play in American culture and within the women's rights movement. After 1890, those women working inside of suffrage organizations wrote less and less about evolutionary science, whereas the feminist women working in freethought, sex reform, and socialist groups continued to publish and speak about the radical potential of Darwinian theory, especially sexual selection. The subsequent chapters chronicle their lives and writings, organized according to the key intellectual themes that the Darwinian feminists advanced.

Chapter 2 analyzes the brief window between 1870 and 1890 when women's rights activists considered science to be a vital part of their agenda and an important tool for their advancement, a development intimately related to the American reception of Darwin. Focusing on the little-known story of Helen Hamilton Gardener's brain donation, this chapter traces the ways in which women used science for feminist purposes and highlights the extent to which discussions of women's rights hinged, quite literally, on the scientific study of women's bodies. This chapter also raises questions about the cultural authority of science, the popularization of science, and the limits of scientific objectivity, questions that were often answered in gendered terms at the turn of the twentieth century.

Chapters 1 and 2 also consider the theme of equality versus difference as articulated by the Darwinian feminists. Were women essentially equal to men, or essentially different from men? Was it possible to be both equal and different? At the heart of the difference question, then as now, was maternity and motherhood. Chapter 3 analyzes how various thinkers applied evolutionary theory to motherhood. Opponents of women's advance-

ment typically claimed that women's foremost function was to bear and raise children; any intellectual or professional endeavors detracted from this sacred duty and imperiled the human race. These arguments were often couched in evolutionary discourse, as exemplified by the much-studied "Race Suicide" panic of the early 1900s. Because of the flexibility of Darwinian discourse, however, evolutionary theory also buttressed a feminist redefinition of motherhood—promoted by Antoinette Brown Blackwell, Charlotte Perkins Gilman, and others—which claimed, in part, that it was unnatural for women to be confined to domestic tasks because female domesticity had no precedent in the animal kingdom. Focusing on feminist applications of animal-human kinship, this chapter examines the turn-of-the-century vogue for fit pregnancy and feminist demands for the reappropriation of domestic duties to enable mothers to work outside the home.

Many feminists and social reformers found that the most provocative idea contained in *The Descent of Man* was Darwin's observation that in all species, except among humans, females selected their sexual mates. To these reformers, restoring "female choice" in humans seemed like a panacea that could solve a variety of social ills, from prostitution, to female subservience, to the excesses of capitalism. Female choice also appealed to reformers because it seemed like a return to a more "natural" state of affairs. Chapter 4 tracks how feminists and socialists utilized female choice to lobby for increased reproductive and economic autonomy for women. Female socialists' trust in science merged with their concerns about the lack of women's reproductive options in the creation of the birth control movement led by Margaret Sanger. Today, as feminists, scientists, and laypeople continue to discuss the relationship between nature and culture, the extent to which biology determines gender, and what a feminist approach to biological difference might be, revisiting the first generation of Darwinian feminists provides both a useful framework and a cautionary tale.



## Eve's Curse

And the rib, which the Lord God had taken from man, made he a woman, and brought her unto the man.

—Genesis 2:22

Prior to the introduction of Darwinian evolutionary theory in the late nineteenth century, the Genesis creation story not only revealed the origins of life on earth, it also explained what it meant to be human and, especially, what it meant to be male and female. By the early 1800s, geological discoveries had cast doubt on the literal six days of creation, but, literal or metaphorical, the Garden of Eden still provided the blueprint for the Christian understanding of the universe. While there are in fact two creation stories in the first and second chapters of Genesis, the latter is the one most commonly reiterated. This version explains that Eve was made from Adam's rib to be his "helpmeet."<sup>1</sup> Soon thereafter Eve caused the couple's exile from the Garden of Eden by disobeying God's word, eating fruit from the tree of knowledge, and successfully encouraging Adam to follow suit. As punishment, God sentenced Adam to a life of toil in the land outside of Eden. To Eve, God thundered, "I will greatly multiply thy sorrow and thy conception; in sorrow thou shalt bring forth children; and thy desire shall be to thy husband, and he shall rule over thee."<sup>2</sup> For generations, the legacy of Eve's secondary creation, sin, and subsequent curse shaped church doctrine, public life, and popular culture, informing individual's images of themselves and their ideas about what was possible for women and men. Thus, to fully understand women's responses to evolutionary theory, we must begin with Eve. Indeed, the most fundamental and perhaps most urgent reason why many women drew inspiration from evolutionary theory, at least initially, was that it provided an alternative

creation story to the Garden of Eden, although, by 1890, the perception of evolution as an alternative to Christianity forced a split within the women's rights movement.

### THE LONG LEGACY OF EVE

Nineteenth-century Americans could expect to hear about Adam and Eve in church, read about them in popular periodicals and literature, and see them depicted in art.<sup>3</sup> In 1833, two paintings entitled "Adam and Eve" and "Paradise Lost" (billed together as "The Temptation and the Expulsion of Adam and Eve") by the French artist Claude-Marie Dubufe toured the United States and "probably drew together greater crowds of spectators than any pictures ever exhibited in the country" (figs. 1.1 and 1.2).<sup>4</sup> In New York City alone, twenty-five thousand people were said to have paid admission to view the paintings.<sup>5</sup> One reviewer concluded from the "vast number of visitors, old and young, of both sexes, that throng by day and night" to see the pictures on display in Philadelphia that "we may be warranted in supposing that the work of no one artist ever before afforded American taste such perfect gratification." This same reviewer observed that Adam and Eve "are interesting in the highest degree to all the human family" because they revealed "the facility of a Temptation to which all the sons of earth fell victims through their beautiful mother, and the agony of an Expulsion, in the endurance of which the intellectual energy of the world's Father sustained and comforted the winning woman for whom he sinned and suffered."<sup>6</sup>

Decades later, William Dean Howells, the legendary nineteenth-century writer and influential editor of the *Atlantic Monthly*, attributed his lifelong interest in art to having seen these very paintings.<sup>7</sup> At the turn of the twentieth century, Howells' friend and colleague Mark Twain published two volumes presenting, in a modern, humorous way, the diaries of Adam and Eve.<sup>8</sup> In the intervening seventy years, it had become culturally acceptable for Twain to satirize the biblical pair, but the key to Twain's humor was that most people were still deeply invested in this ancestral relationship. Twain also proposed, tongue-in-cheek, that the town of Elmira, New York, erect a monument to Adam, since in "tracing the genesis of the human race back to its sources [in *The Descent of Man*], Mr. Darwin had left Adam out altogether."<sup>9</sup> Even as artists like the irreverent Twain toyed with the Garden of Eden story, the original couple informed the stories and images people conjured when contemplating women's role in society.

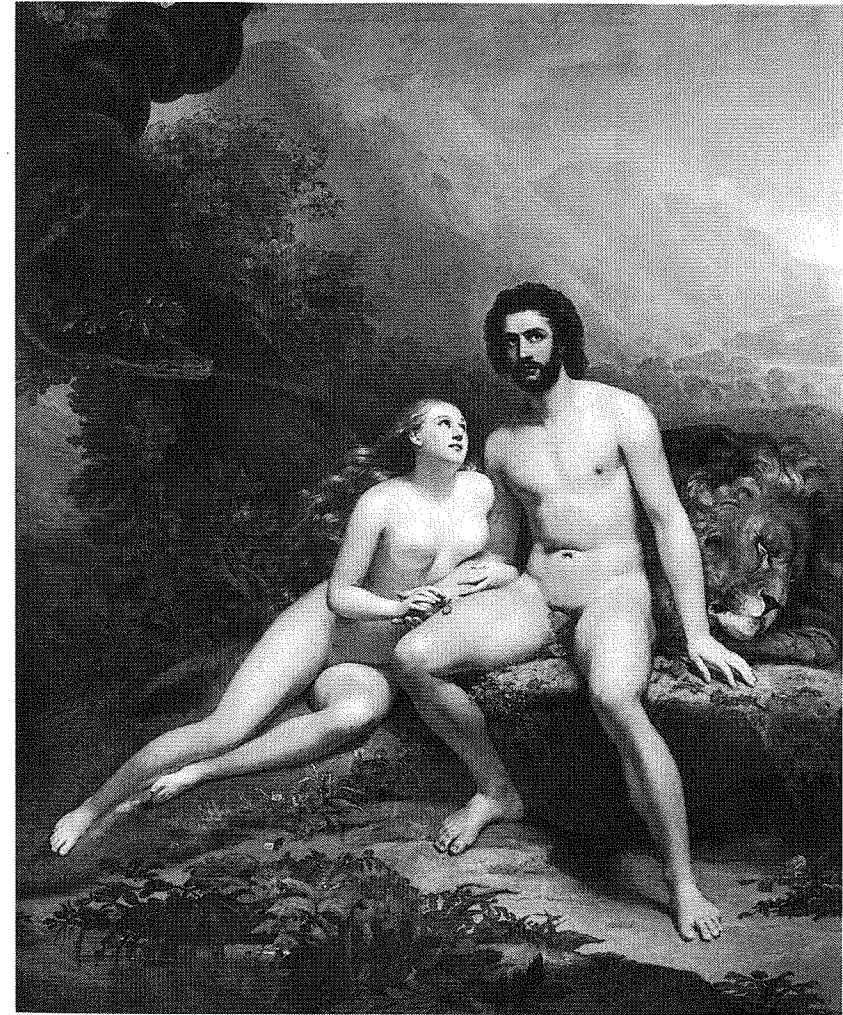


Figure 1.1. Claude-Marie Dubufe, "Adam and Eve" (1827). Courtesy of the Musée des Beaux-Arts, Nantes, France. Photo credit: Art Digital Studio.

In private life, too, Adam and Eve shaped Americans' ideas about what it meant to be man and woman. The historian Anthony Rotundo found numerous references to the biblical pair in his research on conceptions of manhood in the nineteenth century, especially in letters and memoirs (in addition to more public sources). The Bible was the most frequently read book in nineteenth-century America, yet we do not often think of it as



Figure 1.2 Claude-Marie Dubufe, "Paradise Lost" (1827). Courtesy of the Musée des Beaux-Arts, Nantes, France. Photo credit: Art Digital Studio.

a marriage guide. Rotundo's research demonstrates that, in fact, biblical passages on Eve influenced the parameters of many couples' relationships. Not surprisingly, Rotundo found letters written by men "invoking the Bible . . . to support the husband's power" over the wife.<sup>10</sup> He also located several references to Eve in letters and memoirs written by men. Shedding light on the role that the biblical creation story played in shaping male at-

titudes toward women, most of these references to Eve described women as "temptresses."<sup>11</sup> To nineteenth-century readers, the most important message about marriage to be gleaned from the Bible was that God intended for the husband to be the head of the household and, by extension, the nation. As Rotundo observes, "[B]efore a woman defied her husband or dealt with him on equal terms, she had to struggle with the force of biblical injunction and with the centuries of marital tradition that were justified by those injunctions."<sup>12</sup> A daunting proposition indeed.

The narrative and imagery of Adam and Eve was so deeply ingrained in American and European culture that Eve played the pivotal role in debates about women's rights from the seventeenth century, when women began to publicly demand more opportunities, to the twentieth, when they focused on and secured the right to vote. References to Eve reached a fever pitch in the nineteenth century during periods of heightened publicity or success of the women's rights movement: in the 1840s and 1850s, and then again in the 1880s and 1890s. Regardless of the particular question at hand, women were told they were not fit for public or professional life and that they must remain subordinate to men as a result of Eve's secondary creation, transgression, and curse. To be sure, women who agitated for increased educational, personal, and professional opportunities encountered many obstacles, but the one seemingly impenetrable barrier that generation after generation had to confront was the legacy of Eve. Even antifeminist arguments that did not explicitly mention Eve were grounded in the basic premise that women were created as an afterthought and destined for treachery. Opponents of women's rights often drew on the New Testament writings of Paul, for example, but these passages were informed by Eve's conduct in Eden and generally served to remind audiences to heed the lessons in Genesis. As many women's rights advocates noted, Eve provided the foundation from which all other ideas about women developed.

In the decades leading up to the Civil War, the women who dared test the boundaries of their limited sphere, the relatively few that there were, faced their most vocal opposition from members of the clergy, men who were well suited to argue the Bible against women's rights. When pioneering abolitionists and women's rights activists Sarah and Angelina Grimké first spoke in public in the late 1830s, clergymen banded together to bar them from churches and mobilize public opinion against them. In 1837 the Massachusetts Congregational clergy issued a public letter warning that when "a woman assumes the place and tone of man as a public reformer . . . her character becomes unnatural."<sup>13</sup> Nearly twenty years later, at the Fifth National Convention for women's rights in 1854, the activists

cited continued clerical opposition as a singular hindrance to the movement, resolving unanimously, "[W]e feel it a duty to declare in regard to the sacred cause which has brought us together, that the most determined opposition it encounters is from the clergy generally, whose teachings of the Bible are intensely inimical to the equality of woman with man."<sup>14</sup> To men of the cloth, and indeed to the vast majority of Americans, women speaking in public or, worse, on behalf of their own rights violated the most essential facts of God's divine order, the very same order that provided the blueprint for democratic government and public affairs.

Since the Enlightenment, debates about the ideal political order have drawn inspiration and justification from what was seen to be the divine, natural order in the Garden of Eden. As the historian Nancy Isenberg establishes in *Sex and Citizenship in Antebellum America* (1998), "the creation story and the state of nature played a continuing, vital part in antebellum political discourse."<sup>15</sup> At the Virginia Constitutional Convention of 1829, to give just one example, delegate Abel Upshur argued against equal suffrage for men and for the timelessness of a "feeling of property," which, naturally, made some men the rulers of others, as proof: "Adam was the first of created beings; Eve was created next; and the very fiat which brought her into existence, subjected her to the dominion of her husband. Here then was no equality."<sup>16</sup> In depictions of the ideal political state, Eve's secondary status and propensity to sin provided irrefutable evidence against women's rights, including but not limited to voting. In 1849 the abolitionist Richard Henry Dana lectured on "Woman" in Philadelphia. According to coverage of his speech in the women's press, Dana's main point was that women could only "stand in awe and reverence of man" because Adam was the "first man," forever sealing women's fate as secondary and ancillary creatures.<sup>17</sup> Even though he defended women's right to petition, the antebellum statesman, abolitionist, and sixth president of the United States John Quincy Adams denied women rights as equal citizens; such a proposition simply went against God's creation. In his 1842 lecture, *The Social Compact*, Adams explained that in order to understand the ideal plan for democratic government, one needed to look no further than the Garden of Eden. According to Isenberg's analysis, Adams reasoned that "Adam and Eve introduced civil society into the state of nature, and that their union symbolized the universal model of bourgeois society." Eve brought conflict into the Garden of Eden, explaining why men and women should not both be involved in politics. Adam, on the other hand, served as a "cautionary tale about allowing women too much political influence."<sup>18</sup>

Debating God's plan for the universe was a tall order. Nevertheless, pioneering feminists, from Judith Sargent Murray (1751–1820) to Sarah Grimké (1792–1873) to Elizabeth Cady Stanton (1815–1902), all challenged the "rib" story. Antebellum feminists reinterpreted or dismissed Eve in their writings as a way to stake a claim for women's increased participation in public and private life, but, in an era when women could not hold leadership positions in church or state, this tactic met with limited success. According to Murray, one of the first American authors to write on behalf of women, men, rendered "blind" by "self love," were too "wholly absorbed in a partial admiration of [their] own abilities" to notice the real moral in the Garden of Eden tale: Eve ate of the apple to gain knowledge, whereas Adam did so simply because Eve invited him to. "Thus it should seem," Murray concluded, "that all the arts of the grand deceiver . . . were requisite to mislead our general mother, while the father of mankind forfeited his own, and relinquished the happiness of posterity, merely in compliance with the blandishments of a female."<sup>19</sup> Seen in this light, Eve was intellectually curious while Adam was a fool. Sarah Grimké, the antebellum abolitionist who insisted on women's right to speak in public, believed that Adam and Eve bore equal responsibility for their fall from grace and, thus, that they were intellectual equals as well. According to Grimké, "the welfare of the world will be materially advanced by every new discovery we make of the designs of Jehovah in the creation of woman."<sup>20</sup> Twenty years after she wrote, evolutionary theory became one such "new discovery."

Before they could draw on Darwinian evolutionary theory, women countered antifeminist invocations of Eve by citing the first chapter of Genesis, which describes men and women as simultaneous creations. Lucretia Mott, for example, quoted these verses in replying to Richard Henry Dana's 1849 remarks on women as related to Eve. Women claimed that their simultaneous creation made them "co-equal" with men, a powerful intellectual and rhetorical move. Throughout the 1850s, women continued to cite simultaneous creation, coequality, and cosovereignty to justify their campaigns for political inclusion. According to Isenberg's comprehensive study of antebellum feminist thought, coequality must be understood as a "conceptual revolution." These early feminists rewrote the social contract and "carved a theoretical space for women within the imaginary script of the 'original contract' in the state of nature" because their notion of "simultaneous creation challenged the gender asymmetry that enlightened thinkers had firmly rooted in the state of nature."<sup>21</sup> By the 1870s, feminist arguments for simultaneous creation and coequality, along with those questioning the relevance of Eve more generally, enjoyed the support

of the new science of evolution, but arguments linking women's degraded status to Eve persisted.

The mainstream consensus that women's lot in life was forever fixed by Eve's transgression survived the vast cultural upheaval of the Civil War seemingly unscathed and offers perhaps one reason why demands for "universal suffrage" for African Americans and women met with little success during and after the war. In 1873, the Transcendentalist-turned-Catholic Orestes Brownson concluded that women were not fit to rule themselves, let alone others, because "Revelation asserts, and universal experience proves that the man is the head of the woman, and that the woman is for the man, not the man for the woman; and his greatest error, as well as the primal curse of society is that he abdicates his headship, and allows himself to be governed, we might almost say, deprived of his reason, by woman."<sup>22</sup> As another opponent of women's rights succinctly explained in 1869, women were *prima facie* inferior to men because: "1. Her creation was subsequent to that of man. 2. The first woman was taken from the side of man. 3. Her creation was avowedly to supply man with a companion. 4. She was of the sex which implies maternity."<sup>23</sup> Case closed.

In 1871, the feminist paper *Woodhull and Claflin's Weekly* lamented women's limited options when it came to confronting arguments based on Eve. "There is one argument urged in favor of man's right to rule in the political world, and against women's right to participate in the business of legislation, that has never been fully met . . . by the advocates of woman's enfranchisement" observed the author. "The doctrine of the so-called 'Fall of Man,'" the article continued, "has always been the most effective weapon the believers in the divine authenticity of the Scriptures have wielded against the recognition of her equality. Indeed, it is the only basis of nearly all they have to say on the subject."<sup>24</sup> Almost in direct response, the editors of *Godey's Lady's Book*, the most popular women's magazine of the century, criticized "[t]he efforts of that small band of women who assume to represent their sex in claiming the right of suffrage." These women "have so persistently ignored the great and radical differences between the sexes that it is especially necessary to recall them." To understand these differences, women needed only consult "the doctrine of the Bible," which explained "that when banished from Eden, *man* was ordained to be the worker, inventor, and maker of things from earth; the provider and protector for the household; the lawgiver and defender of social, moral, and political rights, the sustainer of moral and religious duties." Women, on the other hand, "reign[ed] supreme" in "the Kingdom of

Home" as "the preserver of life, the first teacher of manhood, the guardian of home, honor, and happiness."<sup>25</sup> What could better support arguments against women's increased participation in public life than the sense that God Almighty had created woman from man's rib to be his helper only for her to defy His instructions and cause the downfall of humankind?

### THE RESURGENCE OF EVE IN THE 1880s AND 1890s

To many people experiencing the fast-paced cultural and industrial changes that characterized the late nineteenth century, women's rights and evolutionary theory were intimately connected as modern developments. To be sure, women's rights activists were not necessarily evolutionists, and the vast majority of male evolutionists were certainly not feminists. Yet, to many observers, feminism and Darwinism were bound together as examples of new ideas that threatened to disrupt the traditional order. Feminism and Darwinism also shared a crucial link in that both necessitated a reevaluation of the Genesis creation story. For women to gain more rights and opportunities, old associations with Eve needed to be cast away; likewise, for those who took Darwinian evolution seriously, a reconsideration of the literal Garden of Eden was also in order. The connection between women's rights and evolutionary theory was often invoked by women's rights activists, as well as by those who opposed both women's rights and evolution. In a pamphlet titled "Woman's Rights" (1867), the Reverend John Todd (whose byline boasted that he was also the author of the aptly titled "Serpents in the Doves' Nest") traced the connection between women's rights and evolutionary theory, noting that both epitomized his generation's "tendency to break up old associations" and their desire "to be emancipated from the beliefs of our fathers." Men of his generation, Todd charged, "would rather feel relieved to have you convince them that they sprang from a race of apes and gorillas." Among women, on the other hand, "there is a wide-spread uneasiness,—a discontentment with woman's lot, impatient of its burdens, rebellious against its sufferings, an undefined hope of emancipation from the originary lot of humanity by some great revolution, so that her condition will be entirely changed!" But, of course, woman could never be "independent and self-supporting" because "God never designed she should be." "Any other theory is rebellion against God's law of the sexes, against marriage, which it assails in its fundamental principles, and against the family organization, the holiest thing that is left from Eden," thundered Todd.<sup>26</sup> Writing

in 1867, Todd was the harbinger of a much larger effort by cultural conservatives to defend the literal Genesis creation story against challenges from religious moderates, women's rights activists, and, now, evolutionists.

Prior to 1875, as the historian of religion Jon H. Roberts has documented, Protestant opponents of evolutionary theory assumed that Darwin's ideas about transmutation would be dismissed by scientists, much like all previous theories of evolution had been before.<sup>27</sup> As a result, they did not spend too much time discrediting Darwin's work or preaching about its negative implications. They trusted that scientists, heretofore their allies, would do this for them. When it became clear by the mid-1870s that Darwin's work was different from previous theories of organic evolution and that the majority of scientists had, in fact, accepted it, orthodox Protestant thinkers realized they had a problem on their hands. To counter the growing scientific consensus in favor of Darwinian evolution, Protestant opponents focused not on the theory's scientific shortcomings—this, they realized, was beyond their expertise—but rather on drawing a distinct line between religion and science: either one was on the side of God and the Bible or one was on the side of Darwin and atheism. To evangelical opponents of Darwin, there was no longer a middle ground. And they undertook a vast public relations campaign to convince Americans that they, too, had to choose between God and Darwin, a strategy that had important implications for the women's rights movement as well as for the American reception of evolution.

While most Protestant intellectuals managed to accommodate their Christian beliefs with evolutionary theory, a vocal minority of opponents honed in on evolution's challenge to special creation and waged war against Darwin. To these Protestant thinkers, God's purposeful creation of humans was the glue holding together the entire Christian belief system. Not only did God's creation of Adam and Eve demonstrate his personal involvement in the world, it also proved that human beings were made in God's image. This was a crucial point. Unlike twenty-first-century Creationists, nineteenth-century antievolutionists did not stress the literal six, twenty-four-hour days of creation; to them, the important thing was that God had personally intervened in the world to create human beings in his likeness. Furthermore, these ministers argued, if Adam and Eve did not fall from grace, then the rest of the Bible, including redemption through Christ, was for naught. Even though Protestant intellectuals disagreed about the exact meaning of the Garden of Eden, "many of them," as Roberts argues, "could agree that the scriptural account of early human history was the linchpin of a proper understanding of the introduction of sin in the world,

its transmission from one generation to another, and the need for the divine grace they believed was incarnate in Jesus."<sup>28</sup> To this line of thought, abandoning a belief in special creation meant impugning the sanctity of the entire Bible. Moreover, included in a belief in special creation were the related convictions that all species were fixed in perpetuity (because God had made each perfect in its own way) and that a tremendous gulf—moral, intellectual, emotional—separated humans from animals. Darwinian evolution challenged all three of these linked beliefs.<sup>29</sup>

To highlight the threat Darwin posed to believers and wayward believers, Protestant opponents delivered countless sermons and published numerous pamphlets extolling the "argument from design" and the Genesis account of creation. As Roberts explains, "In the judgment of many Protestants, challenges that the transmutation hypothesis posed to the veracity of the biblical narrative constituted its most dangerous and alarming feature," especially with regard to the "origin of humanity."<sup>30</sup> Stressing special creation as the foundational building block of Christian faith allowed opponents of Darwin to argue that evolutionary theory was inherently atheistic, no matter what the namby-pamby moderates would have one believe.

The evangelical campaign against Darwinian evolutionary theory was part and parcel of a larger movement at the end of the nineteenth century to define America as a "Christian" nation. Protestant reformers and political leaders also lobbied Congress to declare Christianity the official religion of the United States in a Constitutional Amendment that stated, "Almighty God as the source of all authority and power in civil government, the Lord Jesus Christ as the Ruler among nations, and His Will, revealed in Holy Scriptures, as of supreme authority." In addition to the failed effort to make Christianity the official religion of the United States, reformers also attempted, with varying degrees of success, to strengthen censorship provisions, enforce Sunday closing laws, and teach Protestantism in schools. In her comprehensive study of nineteenth-century censorship law, Helen Lefkowitz Horowitz describes the second half of the nineteenth century as marked by "intense efforts to define the nation as Christian," partially in response to the perceived threat to orthodoxy posed by Darwin.<sup>31</sup> Taken together, these evangelical and reform efforts inspired broad cultural conversations about the significance of the Genesis creation story to the American way of life.

Throughout the 1880s and 1890s, in response to the twinned threats of Darwin and feminism, religious leaders once again called upon Eve to set the record straight with regard to creation and women's appropriate place



in society. Evangelicals in particular responded to the challenges of modernity with calls for a "muscular Christianity," which was also highly gendered.<sup>32</sup> Emphasizing woman's creation as an afterthought and her sinful behavior in the Garden of Eden, nineteenth-century ministers "championed the 'rib' story," in the words of historian Kathi Kern, to settle the woman question, as well as simultaneously bolster biblical adherents whose faith might have waned as a result of Darwin's publications.<sup>33</sup> According to Kern's research, countless biblical commentaries published in the 1880s and 1890s emphasized the manliness of Adam and the femininity of Eve as the exemplars for modern life. Biblical scholars repeatedly cited Eve's curse to suffer in childbirth and be subordinate to her husband as the final word on woman's secondary status. As one biblical scholar contended, "all subsequent passages of the same import are but repetitions and expansions" of this one.<sup>34</sup> Evangelicals described Eve as inherently weak, sinful, animalistic, and "naturally subordinate," traits they also ascribed to modern women.<sup>35</sup>

Evangelical Protestants were joined in their opposition to women's rights by a wide array of political, business, and reform leaders whose own lives were changing in unprecedented ways. The final decades of the nineteenth century witnessed cyclical economic uncertainty, record numbers of labor strikes, and general political instability, forces that coalesced into what some historians have described as a "crisis in masculinity."<sup>36</sup> Furthermore, with what appeared to some to be stronger, more virile men arriving in the United States from Eastern and Southern Europe, native born, middle-class, white men—those who were increasingly confined to unmanly desk jobs—felt doubly threatened. The loss of professional autonomy, coupled with the decrease of physical labor and the influx of immigrants, caused some men to fear for their own virility and status in the political and social hierarchy. Leading public figures including the future president Theodore Roosevelt, himself a recovered "weakling," urged men to head out West and recapture their manhood by participating in manly pursuits like wilderness exploration and hunting.<sup>37</sup> With their status ostensibly in jeopardy, many middle- and upper-class white men were particularly threatened by what they saw as the encroachment of women on the previously male-only spheres of higher education, the professions, and political life.

To defend against these perceived threats to white masculinity, business and political leaders joined evangelicals in invoking Eve to remind women of their sacred, timeless duties. As former President Grover Cleve-

land wrote to the *Ladies' Home Journal* in 1905, "Those who . . . [seek] to protect the old and natural order of things as they relate to women reverently appeal to the division of Divine purpose clearly shown when Adam was put in the Garden of Eden to dress it and keep it." Readers should remember, too, that "Eve was given to him as a helpmeet and because it was not good that man should be alone." As further enticement, Cleveland encouraged Americans to remember the curse cast upon Adam and Eve for disobeying this divine order.<sup>38</sup> During such confusing times, President Cleveland spoke for the legions of white men who sought comfort and order in the patriarchal gender roles outlined in the second chapter of Genesis. Opponents of women's rights and antievolutionists, often one and the same people, were deeply invested in preserving popular faith in the Genesis creation story and resisting the aspects of modern life that threatened to upend it. In an important sense then, what linked women's rights and evolution together in the public imagination was Eve.

#### EVOLUTIONARY THEORY OFFERS AN ALTERNATIVE TO ADAM AND EVE

After generations of being told that the Bible provided the ultimate, immutable justification for female subordination, late nineteenth-century female activists welcomed new, scientific gender paradigms that did not focus on who said what to whom in the Garden of Eden. In 1875, the *Woman's Journal*, the official paper of the American Woman Suffrage Association (AWSA), ran an article triumphantly proclaiming that evolutionary theory heralded a "new day" for women. The author, Claire, enthusiastically reported that if one accepted Charles Darwin's ideas, "Woman can no longer be taunted with having brought on humanity the traditional curse." "Is not the idea fraught with the possible promise of a new day for woman-kind?" she exclaimed. Women would not be able to learn, work, or vote on an equal basis until "the time-worn views concerning Woman's connection with the fall of Man, and hence with all of human suffering and sin shall cease to be entertained." Evolution promised to excise these "time-worn views." Claire lamented that most scientific men ignored, at best, the feminist implications of evolutionary theory, but she concluded "with a sublime faith in the future, that one Utopia of human dreams, we lay aside our doubts and fears and perplexities, and rest in the shadow of that rock of reason—the 'survival of the fittest.'"<sup>39</sup> To Claire, debating women's rights in terms of reason and natural selection, rather than the Garden of

Eden, boded well for women's advancement. As the nineteenth century drew to a close, Claire was just one of many women celebrating the introduction of evolutionary theory into debates about women's rights.

Women's club and women's rights networks probed the nature of sex differences and debated whether answers to the vexing "woman question" could be found through religion, science, or both. Many noted that change was afoot as questions previously answered by the Bible could now also be debated in the realm of evolutionary science. Prominent women's rights activist and abolitionist Thomas Wentworth Higginson compared religion and science to two chivalrous knights dueling to determine which was better able to take care of, and define, women. Even though he saw grounds for hope in both religion and science, ultimately he threw in his lot with science, even as he remained skeptical of male scientists.<sup>40</sup>

Freethinking feminist Helen Hamilton Gardener also linked the cause of women's rights to evolutionary theory in her 1885 essay, "Men, Women and Gods." Like most of her peers, she believed that women's degraded position was related to ideas about Eve. With her characteristic frankness, she observed, "It is always a surprise to me that women will sit, year after year, and be told that, because of a story as silly and childish as it is unjust, she is responsible for all the ills of life." "That because, forsooth, some thousands of years ago a woman was so horribly wicked as to eat an apple," Gardener continued, "she must and should occupy a humble and penitent position, and remain forever subject to the dictates of ecclesiastical pretenders." Luckily, however, "The morals of the nineteenth century have outgrown the Bible. . . . What Moses and David and Samuel taught as the word and will of God, we, who are fortunate enough to live in the same age with Charles Darwin, know to be the expression of a low social condition untempered by the light of science."<sup>41</sup>

Most women's rights activists were not as freethinking as Gardener, and they tended to use evolutionary principles as a way to interpret, not reject, the Bible. Often women cited evolution as evidence for the first chapter of Genesis (simultaneous creation) or as a way to argue that focusing on Eve's transgression denied women the many other important, especially reproductive, roles they played in life. These women attempted to blend science with religion to better understand human creation and sex differences. At an 1869 women's rights convention held in Newport, Rhode Island, Isabella Beecher Hooker, an active suffragist and the sister of Harriet and Catharine Beecher, delivered a speech about the relation of the Bible to women's suffrage. After arguing that Genesis, properly interpreted, was a story of gender equality, she attempted to take her argu-

ment "a step further than this, and presented a number of scientific facts to prove that the highest types of vitality take the female form."<sup>42</sup> By this time, the Bible could no longer stand on its own as the definitive source of information about gender or human origins; instead, Hooker buttressed religious doctrine with examples from nature and "scientific facts."

Similarly, Illinois lawyer and suffrage advocate Catherine Waugh McCulloch applied evolutionary principles to Genesis. In a pamphlet entitled "The Bible on Women Voting," McCulloch reasoned, "[T]he scientists of today quite agree with the Genesis parable concerning the creation; that creation was in the ascending scale, first the lower creatures, then the higher animals, then man, and last at the apex the more complex woman." Read in this light, the order of creation did not support female subordination, but, "it might rather be a reason why men should obey women."<sup>43</sup> In combining the biblical and evolutionary accounts of human origins, McCulloch upended the antifeminist tactic of dismissing women's demands by linking them to Eve's secondary creation. To the contrary, she argued that, from an evolutionary standpoint, Eve's creation from Adam provided evidence for female superiority.

Emily Oliver Gibbes echoed this sentiment in *The Origin of Sin and Dotted Words in the Hebrew Bible* (1893). Here she took Paul to task for interpreting Genesis literally and taking pride "in the fact that Adam was first formed, then Eve." "In these days of belief in evolution it is the other way," Gibbes proclaimed. "If Eve evolved from Adam, she was higher than man" in the order of organic beings.<sup>44</sup> In her compilation of progressive biblical commentaries written by ministers, Frances Willard, the powerful president of the Woman's Christian Temperance Union (WCTU), included one that also blended the evolution and Genesis accounts of creation to argue for women's superiority: "if we find God gradually advancing in his work from the inorganic earth to the mineral kingdom, then to the vegetable kingdom, and last of all making man, the fact that woman is made after man suggests her higher qualities rather than man's superiority."<sup>45</sup> Other advocates of women's rights interpreted evolution to mean that Eve never existed. As Frederic Hinckley, minister of the Free Religious Society of Providence, Rhode Island, wrote in his pamphlet, "Woman Suffrage in the Light of Evolution" (1884), "Eve was not made from one of Adam's ribs, but both have been evolved out of that Universal whose mysteries we cannot fathom, but which we may be sure knows no subjection of the one to the other, having made of one blood all classes and conditions of men."<sup>46</sup>

Throughout the 1870s and 1880s, women's rights advocates cheered Charles Darwin for exposing, once and for all, the fraud of the "rib story."



They believed that evolutionary theory marked a turning point in discussions of gender, one that would be favorable to their cause. For centuries, men and women had debated the meaning of Eve, and, even at the dawn of the twentieth century, the lessons drawn from the Garden of Eden still circumscribed women's opportunities. By presenting an alternative creation story, evolutionary theory offered the potential to revolutionize popular thinking about gender and sex difference.

### RACE-BASED EVOLUTIONARY HIERARCHIES, EDUCATED SUFFRAGE, AND THE TURN TO DIFFERENCE

By the early 1890s, however, changes within the women's rights movement and within the broader American culture made it less acceptable for women's rights advocates to openly espouse Darwinian evolution or apply science to questions of sex difference. For one thing, opponents and supporters of evolutionary theory hardened their positions, and evolutionists themselves divided into several, often competing, schools of thought—making it more confusing for women to advocate one solid evolutionary position.<sup>47</sup> Furthermore, in the decades following the Civil War, rapid industrialization, corporate consolidation, and economic uncertainty characterized the U.S. economy as well as U.S. culture, in what one historian has famously described as “the incorporation of America.”<sup>48</sup> Such vast cultural changes institutionalized and masculinized the definition of science, as chapter 2 will discuss, as well as permanently altered the terrain of the women's rights movement.

Perhaps most important for the purposes of this study, between 1875 and 1890, the women's rights movement transformed from a splintered, fringe element in American culture into a powerful voice in American public life, one that enjoyed the support of thousands of women working together under the auspices of the reunited National American Woman Suffrage Association (NAWSA).<sup>49</sup> Prior to 1890, two competing organizations represented the women's rights movement: the American Woman Suffrage Association (AWSA), which advocated that suffrage be won state by state, and the National Woman Suffrage Association (NWSA), which advocated broad-based feminist reforms at the federal level. Led by the iconoclastic Elizabeth Cady Stanton, NWSA also critiqued marriage and the church, much to the chagrin of the AWSA leaders. The 1890 merger of NWSA and AWSA represented the triumph of the less heretical AWSA vision of women's rights, which focused mainly on securing the vote.

Whereas critiques of the Bible, the clergy, and orthodox Christianity had been a foundational element of antebellum feminist thought, by the 1880s such arguments were frowned upon and ultimately jettisoned from the formal women's rights arsenal as leaders prioritized mainstream appeal and expediency over radical critiques of patriarchy. In important and understudied ways, evolutionary theory was one factor in this tactical and rhetorical realignment of the women's rights movement.

The more measured tone of the post-1890 women's rights movement was amplified by the growing influence of the WCTU and its long-serving president Frances Willard. By far the largest and most powerful women's group of the era, the WCTU eventually came to regard suffrage for women as vital to its larger goal of “home protection.” Specifically, they believed that alcohol and other vices would be banned a lot sooner if women had a voice and a vote in the legislative process. For their part, NAWSA leaders relished the possibility of joining forces with the WCTU, an organization that counted over two hundred thousand members compared with the suffragists' ten thousand.<sup>50</sup> As a result of this new type of member, NAWSA leaders shifted gears to agitate for suffrage within the bounds of mainstream, Christian values. At the same time, the WCTU brought a new evangelical emphasis to women's rights rhetoric, as Kathi Kern describes. WCTU materials bore titles such as “Jesus the Emancipator of Women” and emphasized that it was Christian women's duty to vote, largely in order to outlaw alcohol. For Willard and the large influx of WCTU members of NAWSA, securing the vote for women was part of God's divine plan for Christian women to help purify politics and society.<sup>51</sup> To these women, it did not make strategic or logical sense to dispense with the Bible or accept a materialist science that taught that humans were part and parcel of the animal kingdom, leaving Stanton and her freethinking colleagues out of step with NAWSA.

As it became less and less acceptable to openly critique Christian doctrine on behalf of women's rights, women's uses of evolutionary theory shifted as well. Women's initial enthusiasm for Darwin had emerged in various forms—from wholesale adoption to blending with Christianity—but, by the late 1880s, Darwinian arguments for women's emancipation were most often advanced by women working outside of, or on the periphery of, NAWSA. NAWSA members, on the other hand, increasingly drew on theories of social evolution—those written and inspired by Herbert Spencer and his protégés including the American William Graham Sumner—and less on the nonteleological, naturalistic evolution of Darwin. The women themselves, however, did not often distinguish between Darwin and Spen-

cer and tended to blend both schools of thought together, especially in support of their belief that evolution meant progress. As the historian Jackson Lears explains, "Much American thought in the early twentieth century combined the delusion that Darwinian theory underwrote linear human advance with a vague technological determinism. From this implicitly reformist view, social values as well as political and economic institutions had simply not 'evolved' far enough to keep up with the realities of human experience."<sup>52</sup> Social evolutionary arguments tended to sever evolutionary theory from its radical, materialist implications and in many cases from experimental science itself. Instead, adherents promoted a progressive, goal-oriented evolution that could be merged more easily with Christianity as a tale of triumph for "civilized" (which often meant white) people. Arguments grounded in Spencer's work suggested to female reformers that women's suffrage was one of many changes that could be expected in the near term as part of a larger movement of well-educated, rational individuals moving society onward and upward towards perfection.<sup>53</sup>

Spencerian social evolution, better known today as social Darwinism, enjoyed tremendous support among American intellectuals and reformers at the turn of the twentieth century.<sup>54</sup> While the high school history textbook narrative tends to link social Darwinism to robber barons and the interests of capital over labor that characterized Gilded Age society, historian Robert Bannister and others have shown that this was not exactly the case. As Bannister argues, "more intriguing than social Darwinism itself is what one might term the myth of social Darwinism—the charge, usually unsubstantiated or quite out of proportion to the evidence, that Darwinism was widely and wantonly used by forces of reaction."<sup>55</sup> At the turn of the twentieth century, Spencerian arguments were enlisted by reformers and reactionaries alike, often to contrasting ends. The promise of intentional, continuous progress appealed to Americans across the political spectrum who saw the turn of the century as a time of possibility and change, as evidenced by the wide array of reform movements that flourished during this time period.

Despite the fact that they had much in common, a fault line emerged between freethinking feminists and religious suffragists at least in part over whether or not embracing evolutionary theory also meant questioning biblical authority, a question that often hinged on which school of evolutionary theory one subscribed to.<sup>56</sup> This schism also represents one manifestation of the evangelical efforts described earlier in this chapter to align Darwinism with atheism and encourage people to choose between God and Darwin. Given this false choice, the Christian suffragists who

made up the vast majority of NAWSA members chose God and social Darwinism, whereas the freethinking feminists, led by Stanton, continued referencing Darwin and critiquing biblical authority. Unlike Darwinian theory, social evolutionary theory did not directly confront the biblical creation story, nor did it press the concept of animal-human kinship or challenge the existence of a divine creator. Overall, social Darwinism did more to support than challenge the Anglo-American elite's way of life, making it possible for religious believers and nonbelievers alike to rally around it. As a result, social Darwinist theories did not encounter nearly as much backlash or religious opposition as did the materialistic Darwinian evolution, and they fit well within the overall rhetoric of progress promulgated by NAWSA and WCTU reformers.

The social evolutionary argument for women's rights was perhaps best articulated by Carrie Chapman Catt, the influential president of NAWSA from 1900 to 1904 and again from 1915 to 1920, the years of the final successful push for suffrage. Although Catt was not an enthusiastic or orthodox Christian herself, she helped formulate NAWSA's social evolutionary rhetoric. At the 1893 World's Fair in Chicago, Catt delivered a speech that signaled her enthusiasm for social evolutionary ideals. In "Evolution and Woman's Suffrage," Catt described evolution as "not an hypothesis but an absolute proof that the 'world does move;' that it moves ever onward and upward, that the path of men leads ever nearer and nearer to the perfect and ideal."<sup>57</sup> According to Catt, the only thing holding society back from further progress was that woman had not yet taken her rightful place alongside man at the ballot box, though she trusted this was on the near horizon because "evolution, the greatest truth discovered in our century, is on our side." By evolution, Catt did not refer to change over time by random variation and natural selection, nor did she mention Darwin, animals, survival, or mating in her address. She referred instead to the idea that the world inevitably progressed "nearer the perfect and ideal" and that with "work" women could have a greater say in government that had heretofore been corrupted by less virtuous men.<sup>58</sup>

Catt's version of evolution also buttressed her belief that white women were the most deserving of the vote, often at the expense of people of color and immigrants, because they were the most educated or the most "evolved." Historian Kevin Amidon notes that in Catt's arguments between 1902 and the winning of the vote in 1920, "race was continually linked to sex as an integral part of an evolutionary system of differentiation and evaluation," generally to differentiate between the needs of white, educated women and nonwhite others.<sup>59</sup> To Catt and many of her

fellow reformers, middle- and upper-class white women deserved the same privileges as white men because of their shared levels of education and refinement, so they lobbied for “educated suffrage,” which in practical terms meant white suffrage. In keeping with popular evolutionary thought of the day, they believed that Anglo-Saxons were simply more evolved than other races and that white women had been mistakenly grouped with other downtrodden people when in fact they deserved to be considered on par with white men. As the historian Louise Michele Newman and others have persuasively argued, white racial superiority was a core element of women’s rights rhetoric, and women often invoked evolutionary discourse regarding the racial hierarchy of civilization to support suffrage arguments based on whiteness.<sup>60</sup>

Catt’s beliefs about women and evolution also fit squarely with historian Beryl Satter’s concept of “evolutionary republicanism.” In the early republic, concerned citizens joined with national leaders in stressing that virtuous citizens—economically independent, educated, and moral—needed to sacrifice for the common good in order for the nation to survive. As economic independence, a key component of being a “virtuous citizen,” became increasingly unavailable during the Gilded Age, Satter argues that middle- and upper-class reformers “found a new grounding for the virtue of the nation’s citizens in beliefs about Anglo-Saxon evolutionary superiority.”<sup>61</sup> While the Darwinian feminists were increasingly at odds with the NAWSA suffragists after 1890, the two groups both tended to draw on evolutionary discourse to advocate for votes for educated, native-born white women.

Here again, however, to label the Darwinian feminists, most notably Stanton, as intractably racist, as Louise Michele Newman and others have essentially done, overlooks the nuanced historical context in which these women lived and the range of arguments that they advocated. Certainly, as Kathi Kern has established, the freethinking Darwinian feminists were largely blind to their own racial and class privilege, which was “what allowed them to see gender as the source of all oppression.”<sup>62</sup> Yet, at the same time, historians Ann Gordon and Michele Mitchell encourage a broader lens and a more nuanced appreciation of context and intellectual history when it comes to assessing the role of race in Stanton’s thought and, by extension, the views of other freethinking Darwinian feminists. Gordon argues that historians who claim Stanton’s views were racist and unchanging between 1869 and the mid-1890s “must ignore Stanton’s core convictions and oversimplify complex problems in her thinking and in American history.”<sup>63</sup> Gordon situates Stanton’s support for educated suffrage within

the larger political and reform climates in which she worked, establishing that Stanton never stopped believing in universal suffrage and that calls for educated suffrage were not necessarily made by reactionary racists. For example, by the 1890s many leading African Americans, including W.E.B. Dubois and the congressman John Mercer Langston, also supported education and literacy requirements for voting, especially “if applied to both races equally.”<sup>64</sup> While disavowing the racist tone of many of Stanton’s writings in the late 1860s, Michele Mitchell also urges careful attention to historical context and intellectual history. As she explains, “the debate over whether Elizabeth Cady Stanton was racist or merely elitist is not as relevant as is the sort of racial knowledge available to her during the volatile, early years of Radical Reconstruction. The context in which Stanton pushed for women’s suffrage was one in which citizenship was partially reconfigured through race, in which race, gender, and class were germane to struggles over citizenship.” In the late 1860s, and indeed for much of the second half of the nineteenth century, the popular evolutionary description of a racialized hierarchy from savage to civilized provided convenient language for Stanton to voice her disapproval of black (and other) male suffrage at the expense of white women’s. Thus, Stanton’s articulation of this racialized hierarchy can be understood as, in Mitchell’s words, “at once intriguing, surprising, regrettable, contradictory, and predictable.”<sup>65</sup>

Those scholars who have analyzed the ways in which women’s rights activists utilized evolutionary rhetoric have tended to focus on its applications in terms of race and to argue that its influence was detrimental because it encouraged women to think in terms of difference, permanently deterring the movement from its egalitarian goals.<sup>66</sup> That Stanton’s and other suffragists’ rhetoric was often race based and in many cases racist, to modern readers if not to contemporaries, is most certainly true, echoing the predominant interpretation of evolutionary theory in American culture at the time. When it came to thinking about the differences between women and men, however, the turn to difference had implications in addition to those regarding race. Just as women voiced race- and class-based arguments in campaigns for educated suffrage, they also began articulating demands for women’s rights grounded in the conviction that women were fundamentally different from men. A key component in their gendered thinking was that whiteness was essential to their gender, but they also began making innovative feminist arguments inspired by the ways in which evolution had demonstrated, at least in their minds, that women differed from men.

After decades of invoking the language of equality and natural rights

to argue for women's inclusion in the body politic, many leading activists realized this strategy simply was not working and maybe even stopped believing in it themselves, especially after the crushing defeat of universal suffrage in Kansas and the failure to include women in the Fourteenth and Fifteenth Amendments, which granted emancipated male slaves, but not women, the right to vote. Antebellum female activists were inspired by claims of natural rights, and they frequently extrapolated Enlightenment principles to include women (as vividly established in the 1848 Declaration of Sentiments produced by attendees at the first women's rights convention, which was modeled nearly word-for-word on the Declaration of Independence), but these arguments repeatedly failed to convince male leaders, as well as the vast majority of Americans. Furthermore, as Ann Gordon has established, popular acceptance of suffrage as a natural right waned in the late 1860s as political leaders began legislating and writing about the vote as a "privilege," not a right.<sup>67</sup> Women's rights leaders, none more so than Elizabeth Cady Stanton, were keen to this shifting political landscape.

In September 1868, Stanton, author of the 1848 Declaration of Sentiments and a leading proponent of the inclusion of women in the Fourteenth and Fifteenth Amendments, devoted nearly an entire issue of her newspaper, the *Revolution*, to a speech on the "identity of the sexes in mind" delivered before the British Association for the Advancement of Science by Lydia Becker, a British suffragist, botanist, and correspondent of Darwin. Stanton applauded Becker's decision to discuss the "woman's sphere" from the perspective of "pure science," but she rejected Becker's argument that men and women were equal. As Stanton explained:

We started on Miss Becker's ground [equality] twenty years ago, because we thought, from that standpoint, we could draw the strongest arguments for women's enfranchisement. And there we stood firmly entrenched, until we saw that stronger arguments could be drawn from a difference in sex, in mind as well as body. But while admitting a difference, we claim that difference gives man no superiority, no rights over woman that she has not over him. We see a perfect analogy everywhere in mind and matter, and finding sex in the whole animal and vegetable kingdoms, it is fair to infer that it is in the world of thought also.<sup>68</sup>

Writing in 1868, on the heels of the defeat of universal suffrage, Stanton realized the futility, at least in that historical context, of arguing for women's

rights on the basis of equality with men. Furthermore, as the Darwinian feminists contemplated vast structural changes to society, they realized that men, as well as women, would have to change. Arguments for changing men's roles were harder to make using the language of equality. If men and women were equal, why then would husbands, male-dominated workplaces, and man-made laws have to change? Couldn't they simply be amended to allow women to do just as men did? While denying biological determinism and continuing to stress the structural and cultural elements of gender oppression, the Darwinian feminists' acknowledgement of some biological sex differences—maternity and breast-feeding, for example—allowed them to advance creative innovations and demands, as the following chapters attest.

Moreover, the concept of natural rights, while certainly revolutionary, was not gender neutral. As Thomas Laqueur and others have established, natural rights rhetoric not only left out women, it was expressly constructed to exclude them and eviscerate whatever small political and other privileges (wealthy) women may have had. In order for natural rights language to be persuasive in the seventeenth and eighteenth centuries, whole bodies of knowledge—science, medicine, philosophy—had to be rewritten to define women as fundamentally different from men and, thus, not deserving of natural rights.<sup>69</sup> As a result, by the nineteenth century, medical and popular opinion converged in viewing women as the polar opposites, rather than the mirror images, of men, making it hard for women to convincingly advance arguments on the basis of natural rights. After the failure to include women in the Fourteenth and Fifteenth Amendments and the defeat of universal suffrage in Kansas, many women's rights activists grudgingly came to understand that "all men are created equal" really did mean all "men." Yes, it was inspiring to think that "all men are created equal" might one day include women, but embedded in the very same Enlightenment ideology was the conviction that women could never be considered in the same category as men. Stanton and other women's rights leaders eventually accepted this paradox of Enlightenment philosophy and looked to new thought structures on which to ground their demands. Thus, I am suggesting that we reevaluate women's shift from equality to difference by focusing on the complex interplay among the Bible, natural rights, and evolutionary theory and ask why, given these options, some leading feminist thinkers chose to ally themselves with evolutionary science and difference.

In addition to strategic concerns about the effectiveness of equality arguments, it became harder for women to believe in natural equality after

the scientific and popular embrace of Darwinian theory. In a Darwinian world, all organisms were not created equally. And these slight differences between organisms often decided who lived long enough to pass on traits to the next generation. Moreover, the differences between males and females, especially as described in *The Descent of Man*, provided the key to evolution. As Darwin explained, sexual dimorphism was found throughout most forms of organic life, and it enabled the evolution of higher animals (because it multiplied the possible variations that offspring could inherit). Thus, sex differences were both natural and vital. Darwin noted that "advancement or progress in the organic scale" rested "on the amount of differentiation and specialization of the several parts of a being," notably the differences between males and females that were a telltale feature of vertebrates.<sup>70</sup> Taken together, these insights encouraged women's rights advocates, along with much of the reading public, to think in terms of difference. To Stanton and other Darwinian feminists, admitting (some) biological sex differences did not mean acknowledging female inferiority; rather, it allowed them to critique the male world of work, religious orthodoxy, and politics, instead of simply asking for entry into it, and to suggest that men and male-dominated systems needed to change in order for their goals to be met.

### DARWINIAN FEMINISTS CHALLENGE THE LEGACY OF EVE

Women's rights activists from across the ideological spectrum tended to shift from equality to difference arguments, but the 1890 merger of NAWSA brought the tensions between the freethinking Darwinian feminists and the more conventionally religious social evolutionists to a head. A vocal minority of women, especially those who had been active in the antebellum feminist movement, rejected NAWSA's adoption of Christian rhetoric and opposed the merger of AWSA with NWSA.<sup>71</sup> These women felt strongly that a top priority for the movement was for women to sever themselves, once and for all, from associations with Eve and to affiliate instead with science. Matilda Joslyn Gage, for example, so opposed the 1890 merger that she formed her own short-lived organization, the Woman's National Liberty Union, which insisted upon the separation of church and state and rejected any church doctrine that taught that woman was a secondary creation. Gage, Elizabeth Cady Stanton, Helen Hamilton Gardener, and a core group of like-minded women believed that Christian doctrine provided the intellectual foundation for the oppression of women, and they

steadfastly opposed any affiliation with orthodox Christianity, as well as any reforms based on the idea that the United States was inherently or exclusively a Christian nation. After decades of agitating for women's rights, these women had come to believe that Christian cosmology based on Adam and Eve was the single most powerful barrier to female equality.<sup>72</sup> In the words of Stanton, "it is on this allegory [the "petty surgical operation" that supposedly created Eve from Adam's rib] that all the enemies of women rest their battering rams, to prove her inferiority."<sup>73</sup> Evolutionary theory provided intellectual support for critiques of the rib story and scientific evidence for the simultaneous creation of men and women.

In 1893, Gage published *Woman, Church and State* in which she laid out her argument that "the most grievous wrong ever inflicted upon woman has been in the Christian teaching that she was not created equal with man."<sup>74</sup> Specifically, she charged the Christian church with forming and upholding the "patriarchate," which systematically oppressed women in all stages of life, while at the same time obscuring the history of the pre-Christian "matriarchate" in which women ruled. The state, drawing insight and guidance from the church, adopted similarly misogynistic policies against women. Again, the root cause of both church and state discrimination against women came down to the biblical creation story. Gage observed that Eve continued to govern women's place in modern society: "In nothing has the ignorance and weakness of the church been more fully shown than in its controversies in regard to the creation. From the time of the 'Fathers' to the present hour, despite its assertions and dogmas, the church has ever been engaged in discussions upon the Garden of Eden, the serpent, woman, man, and God as connected in one inseparable relation."<sup>75</sup> Gage was hopeful, however, that science would ultimately "free [woman] from the bondage of the church" by revealing "that Christianity is false and its foundation a myth, which every discovery of science shows to be as baseless as its former belief that the earth is flat."<sup>76</sup>

Like Gage, Elizabeth Cady Stanton became increasingly convinced that Christian cosmology, grounded in the Eve myth, mandated women's oppression. As early as 1863, Stanton made waves in the women's rights movement by declaring that "a book that curses woman in her maternity, degrades her in marriage, makes her the author of sin, and a mere afterthought in creation and baptizes all this as the word of God cannot be said to be a great blessing to the sex."<sup>77</sup> Throughout the 1860s and 1870s, Stanton's growing frustration with organized religion manifested itself in numerous articles in the *Revolution* and, later, the *Woman's Tribune*, where she honed in on the Bible as the ultimate source of women's degra-



Figure 1.3. Elizabeth Cady Stanton (c. 1866–1871), cabinet photograph by Napoleon Sarony. Photograph courtesy of Special Collections, Fine Arts Library, Harvard University.

dation (fig. 1.3).<sup>78</sup> Stanton chided her shortsighted and, in her view, naive colleagues for clinging to the Bible. Beginning in 1878, Stanton and her core group of followers brought forth resolutions condemning organized religion for the subordination of women at every NWSA convention. So strong was their resistance to associations with Eve that the 1885 resolution proposed that NWSA disavow association with any religious body that taught women were inferior as a result of creation.<sup>79</sup> By the 1880s, Stanton had come to believe that women should sever ties with the church once and for all. In an article published in the freethought and pro-birth control newspaper *Lucifer the Light-Bearer*, Stanton argued that the church was built on the oppression of women and, thus, unlikely to acknowledge

“liberty for a sex supposed for wise purposes to have been subordinated to man by divine decree.” Recognizing women’s equality would “compel an entire change in church canons, discipline, and authority, and many doctrines of the Christian faith.” Stanton concluded, “as a matter of self-preservation, the Church has no interest in the emancipation of woman, as its very existence depends on her blind faith.”<sup>80</sup> As a result of such writings, Stanton, always an eclectic thinker and iconoclast, found her ideas becoming anathema to her peers who could see suffrage on the horizon and who did not want to diminish their chances of attaining the vote by being associated with someone who voiced such unorthodox views.

Ultimately, Stanton’s anticlericalism led to her ouster from the women’s rights movement that she had done so much to establish, and she found a new home among the freethinkers. At the end of the nineteenth century, the popularity of Darwinian evolution propelled freethought, a secular movement that spanned the continuum from agnosticism to atheism, from the fringes of respectability to the mainstream. According to Susan Jacoby’s history of freethought, the period from 1875 to 1914 was the Golden Age of the movement, largely because evolutionary theory gave credence to its main claims.<sup>81</sup> Throughout the 1870s and 1880s, the most popular speaker on the national lecture circuit was Robert Ingersoll, the “great agnostic.” Freethought was especially influential on those individuals, including Stanton and Gage, “who moved from liberal Protestantism to outright agnosticism.”<sup>82</sup> Never one to espouse “any deep spiritual conviction,” according to Stanton biographer Lori Ginzberg, Stanton “was far more impressed” with Darwin’s theory of evolution than with any religious fads or ideas.<sup>83</sup>

Evolution provided a boon in adherents and respectability to the freethought movement which, in turn, helped spread innovative ideas on gender and provided crucial forums in which Darwinian feminists could publish and speak as the women’s rights movement contracted to focus on the vote. Stanton became close friends with freethought leader Robert Ingersoll and his wife Eva, and she found a soul mate in fellow freethinking feminist, Helen Hamilton Gardener. Stanton also befriended Benjamin Franklin Underwood and his wife Sara, who popularized Darwin in the United States and published the freethought periodicals the *Index* and *Open Court*.<sup>84</sup> Unlike NAWSA, freethought groups welcomed critiques of marriage, traditional gender roles, and the Bible, and they, too, cheered Darwinian evolutionary theory for introducing the possibility of a completely materialistic universe. The freethought movement provided an ideal outlet for Stanton who was frustrated by continually having to de-



bate clergymen and her more orthodox peers. As Stanton expert Kathi Kern contends, "it would be difficult to overestimate the importance of the free-thought movement to Stanton personally, politically, and intellectually."<sup>85</sup> Throughout her life, Stanton sought a community that would support her far-ranging beliefs about women's rights, and, it seems, the closest she came was her fellow agnostics and atheists in the freethought movement.

Buttressed by her supportive community of freethinkers and by evolution's refutation of the very existence of the Garden of Eden, Stanton decided to make it her mission to convince women that the Bible and the biblical creation story in particular were responsible for their second-class status. To Stanton, clearing up the confusion resulting from Genesis was the linchpin in the broader campaign for women's rights. To aid in this endeavor, she latched on to evolutionary science because it provided the ideal ballast to fight the legacy of Eve. As Stanton wrote in *Lucifer the Light-Bearer* in 1891, "What would be the tragedy in the garden of Eden to a generation of scientific women?" "Scientific women" would "relegate the allegory to the same class of literature as Aesop's fables."<sup>86</sup>

Central to Stanton's critique of patriarchal religion was the time she spent in Europe in the early 1880s recovering from the strain of publishing volume 2 of *The History of Woman Suffrage* and visiting her children, Harriot Stanton Blatch in England and Theodore Stanton in France. During this time, she enjoyed the cosmopolitan secularism of Europe, read evolutionary theory, and became further convinced that suffrage could not elevate women unless they also freed themselves from the belief that Eve caused the fall of humanity and accepted that organized religion was predicated on their oppression.<sup>87</sup> While in London, Stanton confided in her diary that she had "dipped into Darwin's *Descent of Man* and Spencer's *First Principles*, which have cleared up many of my ideas on theology and left me more than ever reconciled to rest with many debatable ideas relegated to the unknown."<sup>88</sup> Or, as she wrote her cousin, Elizabeth Smith Miller, "Admit Darwin's theory of evolution and the whole orthodox system topples to the ground; if there was no Fall, there was no need of a Savior, and the atonement, regeneration and salvation have no significance whatever."<sup>89</sup>

Emboldened by her study of evolution and her time among European freethinkers, Stanton returned to the States determined to reveal the male bias at the heart of organized Christianity through the publication of the *Woman's Bible*, which she considered to be her greatest contribution to women's emancipation. Stanton explained the impetus for the *Woman's Bible* in the freethought newspaper the *Index*:

Believing that the source and centre of woman's degradation is in the religious idea of her uncleanness and depravity, as set forth with innumerable reiterations in the Old Testament . . . the [*Woman's Bible*] committee feel it to be their conscientious duty to investigate the authenticity of the Scriptures. If convinced that they emanate from the customs and opinions of a barbarous age, and have no significance in the civilization of the nineteenth century, they hope to free women from the bondage of the old theologies, by showing that The Bible rests simply on the authority of man, and that its teachings are unfit for this stage of evolution in which the sexes occupy an equal place in the world of thought.<sup>90</sup>

While Stanton was hardly a devout student of Darwin's (she also drew on Auguste Comte, Herbert Spencer, and Jean-Baptiste Lamarck), the popularization of Darwinian evolutionary theory freed her to interpret the Bible as allegory because it was definitive proof of the limits of biblical authority and, especially, because it provided scientific evidence for her contention that Adam and Eve never existed.

The *Woman's Bible* consisted of reprints of all the biblical passages relating to women, which according to Stanton made up just ten percent of the book, alongside commentaries written by Stanton and the revising committee members.<sup>91</sup> In these commentaries, the women focused on translation issues, biblical history, and textual analysis. The commentaries on Genesis provided the dramatic core of the text and were shaped by the writers' familiarity with evolutionary discourse. As Stanton explained, "Scientists tell us that 'the missing link' between the ape and man, has recently been discovered, so that we can now trace back an unbroken line of ancestors to the dawn of creation." Because the allegorical tale in Genesis enabled "the doctrines of original sin, the fall of man, and woman the author of all our woes, and the curses on the serpent, the woman, and the man; the Darwinian theory of the gradual growth of the race from a lower to a higher type of animal life, is more hopeful and encouraging."<sup>92</sup> To Stanton, having apes as ancestors, rather than Eve, boded well for women's rights.

The mainstream press initially greeted the *Woman's Bible* with curiosity, but most reviews of the work criticized either the quality of the writing or Stanton's temerity in selecting such a heretical topic. The only venues where her work was favorably and enthusiastically received were the freethought journals and the *Woman's Tribune*, which was published by *Woman's Bible* revising committee member Clara Bewick Colby.<sup>93</sup> Whether or not they agreed with Stanton's conclusions, however, numer-

ous reviews recognized that Eve continued to define women's place in society. The *Omaha World Herald*, for example, described the *Woman's Bible* as "Eve's version of that little Eden episode."<sup>94</sup> Some women who wrote letters to the *Woman's Tribune* disagreed with Stanton's arguments, but all conceded that the source of women's subjection could be found in the Garden of Eden. One correspondent called it "the one great rock of ignorant superstition which, more than any other, blocks the road of woman's progress."<sup>95</sup> The favorable review in *Lucifer the Light-Bearer* concurred that the "rib story" was "unscientific," "unreasonable," and warranted women's full attention. This reviewer saw grounds for hope in "sexual science," which "concerns the happiness and well being of our race" and "is of more importance to man than a knowledge of any or of all other sciences put together."<sup>96</sup> In addition to refuting Eve, evolutionary theory made this sexual science possible, as subsequent chapters will demonstrate.

Not to be outdone by clerical and mainstream opposition to Stanton's project, NAWSA and the WCTU also publicly criticized the *Woman's Bible*. After having spent years promoting women's inherent piety and moral imperative to assume a larger role in church and public affairs, these women did not want to be associated with Stanton's quixotic quest. The *Woman's Bible* caused so much controversy that Carrie Chapman Catt spearheaded a movement to denounce the text at the 1896 NAWSA convention in Washington, D.C. Only a handful of attendees had read the *Woman's Bible*, but most felt that it damaged the cause by association and scared away potential adherents.<sup>97</sup> Essentially, the debate over whether or not to censure the *Woman's Bible* was also a debate about the future of NAWSA and the larger movement for women's rights: were women solely interested in the vote or did they also want larger, systemic changes? Furthermore, what roles should religion and science play in the movement? After heated debate, Stanton's defenders brokered a toned-down resolution, which read, "That this Association is non-sectarian, being composed of persons of all shades of religious opinion, and that it has no official connection with the so-called 'Woman's Bible,' or any theological publication."<sup>98</sup> Charlotte Perkins Gilman, perhaps the best-known Darwinian feminist, had the mumps and was not planning to attend the 1896 NAWSA convention, but she dragged herself from her sickbed so that she could "fight the resolution disavowing the *Woman's Bible*." She proposed a counter-resolution that declared NAWSA's nonsectarian nature but did not specifically mention the *Woman's Bible*; it failed by five votes. Ultimately, the resolution publicly disavowing the *Woman's Bible* passed by a vote of fifty-three to forty-one.<sup>99</sup> Within a few short years, Stanton and her freethinking colleagues, includ-

ing *Woman's Bible* revising committee member Lillie Devereaux Blake who ran for NAWSA president in 1900 against Carrie Chapman Catt, were purged from the movement and, for much of the next one hundred years, its history.<sup>100</sup>

While the *Woman's Bible* controversy established that the majority of suffragists were not prepared to follow Darwinian evolutionary theory to its most material conclusions, at least not publicly, it also proved that the days of thinking about gender solely in terms of the Bible were over. In this regard, Eve had given way to evolution. Regardless of where one fell on the orthodox-freethought continuum, evolutionary theory provided a new way for women to view the universe and their role in it, and a new language to describe what they saw. Evolution reframed the terms of gender debates from biblical ancestors to animal kin, from individual to species, and from piety to reproduction. Based more on women's bodies than on women's souls and more on women's biological function as mothers than on their religious faith, science, nevertheless, offered the promise of objectivity. In the 1870s and 1880s, a variety of women's rights activists eagerly enlisted evolutionary theory as an ally largely because it provided an alternative to the Genesis creation story and decentered Eve as the barometer by which all women would be judged. Ultimately, the most enthusiastic female adherents to Darwinian evolutionary theory were found outside of the organized suffrage movement, while those influenced by what the philosopher of science Michael Ruse has called "evolutionism" could be found everywhere.<sup>101</sup> After 1890, potentially blasphemous discussions of Darwinian evolution were banished from NAWSA, but the women writing before 1890 left an important and understudied legacy of Darwinian feminism; and, after 1890, feminist women and men working outside of NAWSA continued to probe the revolutionary implications of thinking about gender and sex in terms of evolutionary science. The following chapters chronicle the lives and writings of many of the women who voted against sanctioning Stanton's *Woman's Bible* and who joined Stanton in opposing the NAWSA merger—women whose views of emancipation were informed by evolutionary science and included much more than the vote.

As NAWSA coalesced to work on behalf of women's right to vote and to promote Christian women's influence on society, other reform groups—freethought, socialist, and sex reform—continued to agitate on behalf of women's complete emancipation from male dominance—in the professions, in the classroom, in the church, and in the home. In these circles, Darwinian evolutionary theory was widely discussed and often seen as supporting expanded opportunities for women, more equitable domestic



relationships, and increased sexual autonomy for women. Even though women were confronted with an onslaught of scientific and medical studies proving their “natural” inferiority in the 1870s and 1880s, many welcomed this change of base, as chapter 2 will demonstrate. Unlike the halls of Congress or the inner sanctums of churches, women were players in the evolutionary saga, and they, too, could study the latest evolutionary science, interpret it against their experiences, and challenge the experiments of others. Of course, biblical calls for and against women’s rights persisted, but, after the publication of Darwin’s *The Descent of Man* in 1871, the major forum for debates about women’s rights began to shift from *Genesis* to *Popular Science Monthly*. Women’s tactics reflected this change—a change that in many ways they had helped to engineer.

## “The Science of Feminine Humanity”

In July 1925, when suffrage leader and feminist author Helen Hamilton Gardener (born Alice Chenoweth) died, her last will and testament contained an unusual stipulation. Gardener specified that upon her death, her brain be removed from her body and donated to the Burt Wilder Brain Collection at Cornell University for scientific examination, as long as it was intact and not damaged by disease. To ensure that her wishes were carried out to the letter, Gardener twice amended her will, named the specific doctor who would remove her brain, and consulted various lawyers to make sure the document was airtight. Like many of her peers, Gardener believed that one’s level of intelligence and aptitude could be determined by looking at one’s brain. Unlike most of her contemporaries, however, Gardener rejected the idea that brains differed according to sex—or at least that her brain had been hampered by her sex. She believed that her brain represented the highest development possible for a woman and, thus, that it would provide the ideal specimen to compare with the often-studied brains of eminent men. As she explained in her will, she hoped her donation would “aid science in making a fairer comparison between the brains of men and women ‘who think.’”<sup>1</sup> She also believed, as this dramatic bequest demonstrates, that science should be the ultimate arbiter of questions regarding sex difference.

In her seventy-two years of life, Gardener wrote eight books, delivered countless addresses on the reform lecture circuit, married two times, traveled the world, and helped secure the passage of the Nineteenth Amendment by orchestrating behind-the-scenes talks with high-ranking congressional and White House officials, including President Woodrow Wilson and Speaker of the House James Beauchamp “Champ” Clark. Although Gardener had opposed the 1890 merger of the National Woman Suffrage

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Fig. 2.1. Helen Hamilton Gardener, c. 1920.  
Photograph courtesy of the Library of Congress.

Association with the American Woman Suffrage Association to form the National American Woman Suffrage Association (NAWSA), she became a NAWSA vice-president after moving to Washington, D.C., in 1907. Throughout the 1910s, when NAWSA leaders needed to deliver a sensitive message or plead a point to a powerful elected official, they enlisted Gardener, whom they gratefully referred to as the organization's "diplomatic corps."<sup>2</sup> Upon the ratification of the Nineteenth Amendment in 1920, President Wilson wanted to send a signal that women now held a prominent place in the nation's affairs. So he nominated Gardener to fill a vacancy on the U.S. Civil Service Commission, making her the highest ranking woman in federal government (fig. 2.1). Women's rights activists cheered her selection, and Gardener relished her high-profile post. When she died just five years later, however, she believed that her biggest accomplishment was yet to come: Gardener wanted the scientific dissection

of her brain to establish, once and for all, that women's brains were not structurally, or otherwise, inferior to men's. Such claims were a staple of nineteenth-century antifeminism, but Gardener trusted in experimental science, interpreted objectively, and she believed that once a brain like hers—educated, well trained, and active—had been studied, no one would dare make such ill-informed claims again. She was partially right.

Helen Gardener's brain donation demonstrates the extent to which many nineteenth-century women trusted in science as an ally, as well as the extent to which debates about women's rights often hinged on women's bodies. This extraordinary story also represents one chapter in a longer struggle, led by women, to redefine mind-body dualism. Darwinian evolutionary theory provided compelling evidence for the idea—popularized by Rousseau and others during the Enlightenment—that physical traits correlated with mental ones. Since women's bodies tended to be smaller than men's, then surely their intellectual capacities were smaller too, or so the thinking went. In the nineteenth century, women conceded that there were physical differences between the sexes, but they struggled against the notion that these physical differences indicated any sort of mental (or other) inferiority. Furthermore, this little-known episode epitomizes women's efforts to help shape the emerging discipline called "science" and utilize it as a feminist tool, efforts that peaked in the 1870s and 1880s and were subsequently abandoned as the women's rights movement contracted to focus on the vote and as science became increasingly professionalized and masculinized.<sup>3</sup> In fact, by the time Gardener made her historic brain donation, it received front-page coverage for several days in the *New York Times* but scant attention in the women's press. Gardener began merging her commitment to feminism with her interest in science in the 1870s and 1880s, by engaging in highly publicized debates over the structure of women's brains, and perhaps did not realize that she was a relic in this regard by the 1920s, or perhaps she wanted her final statement on women's rights to remind younger generations of the symbiotic relationship between science and feminism.

By the mid-1870s, if one wanted to influence the debate on women's rights, it was no longer enough to consult the Bible—one also needed to be armed with scientific, ideally evolutionary, evidence. As Gardener trenchantly observed, "manly men are beginning to blush when they hear repeated the well-worn fable of the fall of man through woman's crime and her inferiority of position and opportunity, justified by priest and pleaser, because of legends inherited from barbarians—mental deformities worthy of their parentage." But, Gardener warned, "Conservatism, Ignorance, and

Egotism" had called in "medical science, still in its infancy, to aid in staying the march of progress." As a result, "Equality of opportunity began to be denied to woman, for the first time, upon natural and so-called scientific grounds . . . It was no longer her soul, but her body, that needed saving from herself."<sup>4</sup> Key women's rights activists recognized the shift from religious to scientific denials of women's equality, and, during the 1870s and 1880s, they resisted inaccurate pronouncements about their abilities veiled in the discourse of "science" and began trying to shape the emerging field of science themselves. In the words of Antoinette Brown Blackwell, an outspoken Darwinian feminist, in order to refute the false pronouncements of male scientists, women had to create the "science of feminine humanity."<sup>5</sup>

Rather than being passive victims of the new science of sex differences, women actively participated in this science by demanding to have their experiences objectively studied and by critiquing the biased methods of male scientists.<sup>6</sup> Unfortunately, these female science enthusiasts, much like the white male scientists they critiqued, generally turned a blind eye to analogous examples of racism in the emerging natural sciences, leaving an unjust and unfortunate legacy of scientific racism for the twentieth century. This chapter chronicles the developments leading up to Gardener's historic brain bequest, and it tells the larger story of women's engagement with science during the final third of the nineteenth century, a trend many attributed to the popularity of Charles Darwin and the questions his work raised about the practice of science and the biology of sex differences.

### "TO TEACH THE TRUTH IN NATURE"

Gardener's brain donation was the most dramatic example of women using their bodies and their physical experiences to create a more accurate and inclusive biology of sex difference, but she was not the only woman to recognize the radical potential of science, especially evolution, for those interested in women's rights.<sup>7</sup> Indeed, over one hundred women were so inspired by evolutionary science that they corresponded with Darwin himself.<sup>8</sup> Hundreds more published science-related articles in magazines including *Popular Science Monthly*, enrolled in summer science classes such as those offered by Harvard, or participated in discussions of scientific topics sponsored by women's clubs.<sup>9</sup> Many more read about scientific discoveries and the accomplishments of female scientists, which were front-page news in the *Woman's Journal* and the *Woman's Tribune* throughout

the 1870s and 1880s.<sup>10</sup> One of the earliest and most prolific advocates of women's engagement with science was Antoinette Brown Blackwell.

Antoinette Brown Blackwell knew firsthand what it felt like to be barred from intellectual and professional goals because of her sex, and, like her acquaintance Helen Gardener, she ultimately looked to science for recourse. When Blackwell entered Oberlin College in 1845, she intended to become the nation's first ordained female minister, despite the fact that her advisor, the legendary revivalist preacher Charles Grandison Finney (and pretty much everyone else), disapproved of women speaking in public, to say nothing of a woman leading a congregation.<sup>11</sup> On September 15, 1853, she succeeded, ascending to the pulpit of her own Congregationalist parish in South Butler, New York. However, her hard-won and historic tenure lasted only a few months. After all the years of fighting the church and educational establishment for the right to preach, Blackwell began to lose her faith in Christian orthodoxy.<sup>12</sup> While she retained her belief in an omnipotent higher power, she officially resigned from her pulpit on July 20, 1854, and turned her attention to science.<sup>13</sup> In 1869, Blackwell published her first book, *Studies in General Science* (and sent a copy of it to Darwin), and in 1875 she became the first woman to publish a feminist critique of evolutionary theory with *The Sexes throughout Nature*.<sup>14</sup> In her later years, Blackwell struggled to combine her belief in a higher power with science by writing about the scientific basis of life after death; though she was no longer an orthodox Christian, Blackwell's definition of science involved a heavy dose of spirituality.<sup>15</sup> Blackwell's earlier writings highlight the ways in which feminists responded to evolutionary theory, and they document the shift that occurred in the second half of the nineteenth century as women and men increasingly looked to evolutionary science, rather than the Bible, to better understand sex differences and women's proper role in society. Or, as Blackwell put it, "it is time to recognize the fact that the 'irrepressible woman question' has already taken a new scientific departure."<sup>16</sup>

Blackwell did not have any formal scientific training, except for some youthful scientific investigations conducted with her brother, nor did she administer any scientific experiments herself.<sup>17</sup> Rather, she read widely in evolutionary science and attempted to reconcile what she read with what she saw around her and what she experienced as an educated woman and mother. She also exhibited a characteristic nineteenth-century enthusiasm for science and the scientific method. Blackwell biographer Elizabeth Cazden describes Blackwell's firm faith that "the scientific method of rea-

soning from established facts" would ultimately lead to a true understanding of gender difference, as well as determine whether or not there was an afterlife.<sup>18</sup>

While Blackwell was enthusiastic about science, she had her doubts about the authority invested in the findings of male scientists. As Blackwell insisted, "[I]t is to the most rigid scientific methods of investigation that we must undoubtedly look for a final and authoritative decision as to woman's legitimate nature and functions." Whatever the results, she implored women to "most confidently appeal" to "Nature as umpire—to Nature interpreted by scientific methods."<sup>19</sup> The problem, according to Blackwell, was that scientific methods were often perverted by male scientists. In particular, Blackwell lamented that evolutionary theory had been misinterpreted by "the wisest, the highest, the most progressive and the most influential authorities in science to-day." Because they were "standing on a learned masculine eminence, looking from their isolated male standpoints through their men's spectacles and through the misty atmosphere of entailed hereditary glamour," these authorities could see only evidence of women's "natural" inferiority.<sup>20</sup> Especially egregious in this regard were Charles Darwin and Herbert Spencer, "thinkers who have more profoundly influenced the opinions of the civilized world than perhaps any other two living men. . . . and [who] endorsed by other world-wide authorities, are joined in assigning the mete and boundary of womanly capacities." Unfortunately, Darwin and Spencer accepted the theory of "male superiority" as a "foregone conclusion" rather than establish it scientifically using "adequate tests" and "careful and exact calculation."<sup>21</sup> Furthermore, Blackwell fumed, what exactly did men like Darwin and Spencer know about "the normal powers and functions of Woman"?<sup>22</sup> The problem, then, was not science but the fact that science was being conducted mainly by men, for men, and did not include accurate studies of women.

According to Blackwell, if one really wanted to learn about women, one must turn to women themselves. Expecting a backlash, Blackwell admitted, "I do not underrate the charge of presumption which must attach to any woman who will attempt to controvert the great masters of science and of scientific inference." "But," she claimed, "there is no alternative! Only a woman can approach the subject from a feminine standpoint; and there are none but beginners among us in this class of investigations."<sup>23</sup> What women lacked in specialized training and laboratory access, they made up for by having female bodies and female experiences, traits which no male scientist could boast. Woman, Blackwell advised, "must consent to put in evidence the results of her own experience, and to develop the

scientific basis of her differing conclusions." If woman failed to speak out, she must "forever hold her peace, consent meekly to crown herself with these edicts of her inferiority."<sup>24</sup> Understanding the differences between men and women, according to Blackwell, required "a deeper reading of facts, a reconsideration of all the old data, from the bottom upwards; in a word, a new science—the science of Feminine Humanity." As Blackwell explained, the key to this new science was that "the experience of women must count for more here than the observation of the wisest men."<sup>25</sup> This science was not only "new" because it studied women firsthand; it was also "new" because it challenged the masculine boundaries being erected around the practice of science itself.

Throughout the 1870s and 1880s many of the nation's leading women joined Blackwell in her efforts to create a "science of feminine humanity." In the summer of 1886, for example, Smith College, the prestigious women's school in Northampton, Massachusetts, erected an historic building: the Lilly Hall of Science, the nation's first building dedicated to women's scientific studies and experimentation. Founded in 1872 as a bequest from Sophia Smith to provide women the "means and facilities for education equal to those which are afforded now in our Colleges to young men," Smith College quickly became a leader in the higher education of women and the first to offer women the standard male curriculum.<sup>26</sup> Central to this challenging curriculum was science. In his inaugural address, Smith president L. Clarke Seelye explained that the college wished to avoid "that narrowness which has always been the bane of female education" and, instead, to encourage young women to study the natural sciences so that they would be prepared to "feel an interest in the progress of science; to clearly comprehend its important discoveries, and to be prepared to make, afterward, in some chosen field, original investigations."<sup>27</sup> This was a bold undertaking. At the time, few believed that women were capable of comprehending science, let alone conducting original investigations.

Smith students were especially interested in evolutionary science and the fields of zoology and biology, but by the early 1880s the young women's interest in science had outpaced the college's infrastructure. President Seelye endeavored to find a donor to fund the construction of a building dedicated to scientific study among women, which proved a difficult task. In 1884, he happened to share a ride to Boston with Alfred T. Lilly, a wealthy, iconoclastic entrepreneur from nearby Florence, Massachusetts, who eventually offered his financial support.<sup>28</sup> Lilly had made his fortune in silk manufacturing, and he was a supporter of women's education, as well as a critic of Christian orthodoxy.<sup>29</sup> Seelye recalled that Lilly had told him that

if the funds had been needed for a male institution, he “would never give a cent,” but he “believes in science, and believes that truth is as valuable for women as men.” According to Lilly’s wishes, the engraved plaque on the Lilly Hall of Science reads, “Gift of Alfred Theodore Lilly to teach the truth in nature.”

By all accounts, the female students of Smith relished the new laboratory spaces made available to them. As Smith student Gertrude Gane wrote her mother in 1893:

I enjoy thoroughly my lessons this term, particularly Zoology. It is simply fascinating. We have nine laboratory hours a week as well as two lectures. We are now working on the skeleton of vertebrates, and I have already manipulated a mud puppy and an alligator (small). Today I spent about five hours in the laboratory, preparing a beautiful great rat. In the midst of the operation, I cooked him, and the savory odors were greatly enjoyed by all the students.<sup>30</sup>

So popular were the laboratory classes that by the 1890s, just a few years after the dedication of Lilly Hall, the students were already clamoring for additional laboratory space. Steel and railroad tycoon Andrew Carnegie agreed to provide half the funds for a new biology lab building in 1905, but the building was not completed until 1914.<sup>31</sup> For twenty-eight years, Lilly Hall was the seat of science at Smith College and, indeed, a model for the nation, as figure 2.2 shows.

The ramifications of Lilly’s donation were both symbolic—building laboratories for women showed that they could contribute to scientific progress, not just learn about the innovations of others—and practical, as generations of female students availed themselves of its state-of-the-art facilities. Reporting on this landmark donation, the *Woman’s Tribune* called it “magnificent” and reprinted long excerpts from Lilly’s speech about the importance of scientific education for women.<sup>32</sup> The *Woman’s Journal*, the official paper of the American Woman Suffrage Association, also devoted front-page coverage to this historic occasion, noting that applications to Smith were on the rise and that the next entering class would likely be the largest yet.<sup>33</sup> The Lilly Hall of Science concretized women’s burgeoning interest in science and the growing consensus among those interested in female advancement that science was good for women.

At the same time, the women’s club network—which included book clubs and volunteer societies, as well as more overtly feminist groups—also sought to engage with science. Most notably, the Association for the



Fig. 2.2. Smith College students in Professor Harris Hawthorne Wilder’s zoology class laboratory, Lilly Hall of Science, Smith College, c. 1895. Photograph courtesy of the Smith College Archives, Smith College, Northampton, Massachusetts.

Advancement of Women (AAW), which was founded as a national organization for professional women, did much to promote science among women.<sup>34</sup> Although smaller in number than the larger reform organizations such as the Woman’s Christian Temperance Union, AAW members tended to be very prominent members of their communities. Member Anna Garlin Spencer described AAW membership as “a union primarily of achieving personalities.”<sup>35</sup> An outgrowth of Sorosis (the first organization for professional women) and the New England Women’s Club, the AAW convened national congresses from 1873 to 1897. Their events attracted women from a variety of professions, although the women themselves tended to be white and middle or upper class, and their agendas tell us much about what was on “achieving” women’s minds at the end of the nineteenth century. One item at the top of the AAW members’ priority lists was science.

Maria Mitchell, the first AAW president and a noted astronomer, was perhaps the most dedicated and influential advocate for women in the sciences. In 1847, Mitchell discovered a comet that bears her name, and she was elected to the American Academy of Arts and Sciences in 1848. When famed naturalist Louis Agassiz sponsored her for membership in the American Association for the Advancement of Science in 1850, the members unanimously approved her application. Throughout her life, Mitchell

passionately lobbied on behalf of women in the professions, especially science. In her presidential address at the 1875 AAW convention, Mitchell expounded on the need for women in science: "In my younger days, when I was pained by the half educated, loose, and inaccurate ways which we all had, I used to say, 'How much women need exact science,' but since I have known of some workers in science who were not always true to the teachings of nature, who have loved self more than science, I have said, 'How much science needs women.'"<sup>36</sup> Like Antoinette Brown Blackwell (her colleague on the AAW's science committee), Mitchell seemed to suggest that scientific investigation could be conducted more accurately, free from inherited privilege and bias, by women. Compared with men, she believed that women also had keener "perceptions of minute details" and the "capacity for patient routine," which would be of "immense value in the collection of scientific facts." Further, Mitchell believed that women's daily activities prepared them for careers in science: "when I see a woman put an exquisitely fine needle at exactly the same distance from the last stitch . . . I think what a capacity she has for astronomical observations."<sup>37</sup> To promote women's entry into science, Mitchell suggested that the AAW found a science society where women "engaged in the study of natural or physical science" could present their findings.<sup>38</sup> With this proposed AAW science society, Mitchell hoped to set up an alternate path to professionalization for women, but the historical record does not indicate that this society ever materialized.<sup>39</sup> She did note favorably, however, in the 1875 Science Committee report, the "very encouraging fact" that "women are learning to give money to aid schools of science—for women as for men."<sup>40</sup>

Perhaps because of Mitchell's influence as the group's founding president, the AAW prominently featured scientific addresses at its annual congresses. Indeed, scientific topics accounted for between one-third and one-fourth of all papers delivered at AAW conventions held between 1873 and 1890.<sup>41</sup> At the 1875 AAW congress, for example, science committee member Grace Anna Lewis provided a how-to guide for women interested in science. She listed the schools that offered science courses for women, the organizations women could join to learn about science (including the American Philosophical Society and the American Academy of Natural Sciences), and various museums around the country that women could visit to learn about science.<sup>42</sup> To the women of the AAW, "science" implied being modern, thinking independently, and being able to understand the natural world. This sort of critical thinking was precisely what opponents of women's equality feared, and they called in their own version of science to thwart women's advancement.

## THE SCIENCE OF GENDER AND THE GENDER OF SCIENCE

While many of the nation's leading women were convinced that science was good for their cause, male scientists, together with most mainstream Americans, were not so sure. Bolstered by the popularity of evolutionary theory, male scientists and physicians seemed obsessed with studying the female physique to pinpoint the "natural" basis for women's physical and intellectual inferiority. The resulting debates between male scientists and pro-science feminists raised as many questions about the practice of science as they did about the biology of sex difference. As the historian Daniel Patrick Thurs persuasively argues in *Science Talk: Changing Notions of Science in American Popular Culture* (2007), "science" as a field and as a term was very much in flux at the end of the nineteenth century. Prior to 1850, science was more or less synonymous with any type of "systemized knowledge" and did not conjure larger meanings of a unique method, experimentation, or professional training.<sup>43</sup> The public reception of Charles Darwin provided a tremendous occasion to discuss what exactly science was and who should be doing it. Between 1870 and 1900, experts and laypeople debated whether science should present "just the facts" or whether science should also pose original questions, analyze data, test speculative hypotheses, and aggregate information into meaningful patterns.<sup>44</sup> By 1910, expert and popular notions of science solidified as science came to be understood as a specialized form of knowledge, practiced by trained professionals, following established protocols and methods, in university- or government-sponsored laboratories or studies. As Thurs emphasizes, however, these developments were contested, and laypeople, together with practicing scientists, helped create the meaning of science. Women, too, played a key role in this process, even though the emerging field of science largely excluded them.

As science gained in cultural authority, scientific practitioners, together with some of the reading public, engaged in what Thomas Gieryn has called "boundary-work" to distinguish science from not-science.<sup>45</sup> Boundary-work refers to the ideological and rhetorical practices employed by scientists to confer prestige, cultural authority, and intellectual autonomy upon science by separating it from other forms of knowledge.<sup>46</sup> Whereas before 1870, amateur studies were welcomed as valuable contributions to science—in fact, Darwin himself relied on countless amateurs to collect and share the data that made up his major works—after 1870 a distinction began to be made between amateurs and professionals. Thurs's



research further demonstrates that at the turn of the century “a variety of institutional structures emerged that set researchers in scientific fields apart as a professional class, protected their autonomy, determined correct procedure, and moderated disputes by sanctioning some kinds of knowledge as real science.”<sup>47</sup> By the 1900s, this boundary-work was nearly complete as a clear line separated scientists from amateurs and scientific research from other types of scholarship. Such boundary building had profoundly gendered and racialized implications.

At the same time that Americans were debating what exactly counted as science, a closely related question was, Who could participate in science? Before 1850 there were no specialized university or graduate-level programs in science, and the word “scientist” did not come into popular parlance until the twentieth century.<sup>48</sup> As specialized science education programs developed, however, they largely excluded women and African Americans, who were also not welcomed into professional organizations, nor were their “amateur” studies and experiments considered “science.” The general public, including practicing amateur scientists like Blackwell, could access, read, and contribute to popular scientific periodicals, such as *Popular Science Monthly*, but had less and less access to the professional scientific journals such as *Nature*. In 1891, Blackwell published an article in a popular periodical entitled “Women in Science,” in which she observed that, compared with the gains women were making in other fields, progress in science presented unique challenges. Women were very interested in science, a “pre-eminently modern” field, but “the doors of instruction generally not being open to them, it has been extremely difficult to climb up in some other way without being regarded as thieves and robbers.” Blackwell recounted the many successes of notable women scientists, including the astronomer Maria Mitchell and the botanist Mary Treat, but she lamented that owing to a lack of access to “expensive appliances of well-furnished laboratories, facilities for making difficult experiments and tests, skilled assistants, [and] the emulation and approbation of co-workers” women had not yet been able to discover “great facts, laws or principles which mark an epoch in science.”<sup>49</sup> The Lilly Hall of Science bucked these trends, but it stood out as an outlier, not the norm. Most women interested in science in the late nineteenth century had to carve out alternative spaces for themselves to learn about, comment on, and in a few cases practice science through the women’s club network, popular periodicals, libraries, and museums. Such spaces offered women opportunities to critique the work of male scientists and help shape public under-

standing of science, but they did not tend to confer scientific authority or prestige on women themselves.

To the women writing enthusiastically about science in the 1870s and 1880s, however, it was not necessarily apparent that they were soon to be excluded from official science. To them, science meant freedom from stories about virgin mothers and evil temptresses, and science represented a burgeoning field of study that, when conducted properly, could reveal essential truths about nature and about people. Evolutionary science in particular appealed to these women because it implied that there was a connection among women, men, and all other living things as well as an orderly, knowable process explaining human development. When women engaged in science, they contemplated questions about the natural universe and their own bodies in systematic ways using experiential knowledge, experimental evidence, and survey data from other women, and they shared information about their bodies and their health with others, even if, for the most part, they were not allowed access to the newly forming scientific establishment.

Whereas the women examined in this chapter tended to invoke science to resist the status quo and present alternative possibilities, men within the scientific establishment generally invoked science to defend the status quo, at least in terms of gender. When it came to divining the natural order of things, most male scientists presumed that the status quo was natural—they only needed to explain how and why it had come to be. The women outside the burgeoning scientific establishment and the men within it often consciously realized that they had different definitions of science, and, in fact, the essays and experiments studied in this chapter underscore these cleavages just as they helped to establish what science meant at the end of the nineteenth century. The gulf separating women’s hopes for science from the reality of science as it was then practiced also explains what drove Helen Gardener to donate her brain to Cornell nearly forty years after the brain size debates made headlines.

### IS INTELLIGENCE A SECONDARY SEX CHARACTERISTIC?

Nowhere was the link between the emerging definition of science and the future of women’s rights more apparent than in the debates regarding the higher education of women, which raged throughout the 1870s and 1880s. “If [a woman] applies for admission to Harvard,” Antoinette Brown Black-



well observed, "Harvard can offer its most humane denial in the name of Physiology."<sup>50</sup> Which is, more or less, what Harvard did. But, when faced with scientific studies claiming to confirm their physical and mental inferiority, women responded with their own scientific studies and with the evidence of their experiences. Previous examinations of the debates regarding women's education and intellect covered in this chapter have tended to focus on the misogynistic bias at the root of male pronouncements about female inferiority. These studies tell the story of how nineteenth-century scientists and doctors colluded to pathologize menstruation, essentialize women according to their maternal function, and, in general, bar women from the professions.<sup>51</sup> If one focuses on the writings of Edward Clarke, William Hammond, and, to a lesser extent, Darwin, this is certainly the story that emerges. However, if one also looks at the ways in which women disputed these theories and if one examines the long-term trajectories of these debates, a more nuanced story comes to light. In each case, women asserted their own definition of science that depended upon inclusivity and freedom from ideology, amassed their own data, and rejected biological determinism by challenging the supposed boundary between nature and culture. In most cases, women debunked pseudoscientific theories of female inferiority and demanded more rigorous and accurate descriptions of female physiology, expanding the scope of scientific knowledge and honing its practice.

In the decades following the Civil War, young women's realities differed tremendously from their predecessors, even those who had come of age only a decade or two earlier. Because the war took the lives of so many men, there were fewer men to enroll in college, fewer men to work the new jobs created by the vastly expanded postwar industry, and fewer men to marry. As a result, more women than ever before had to find ways to support themselves. At the same time, colleges and universities, smarting from rapid expansion and dwindling numbers of male students, began encouraging women—new sources of tuition—to enroll. Lacking the traditional option of early marriage and excited by the increasing opportunities available to them, a growing number of women pursued college degrees. In 1870, when just one percent of the population attended college, twenty-one percent of attendees were women. By 1910, women made up forty percent of college attendees.<sup>52</sup> These dramatic demographic changes elicited heated public debates. Was it healthy for women to attend college? Would doing so imperil future offspring? Opponents of female higher education argued that education not only dismantled sex differentiation but also stymied the evolutionary process by diverting women from motherhood. Further-

more, they argued, women simply were not suited to the rigors of higher education. For evidence, one needed only to look at their bodies.

The concurrent fascination with evolutionary discourse offered one compelling way to interpret sex differences. As one scientist noted, since Darwin "remodeled" natural history, it has "been found capable of throwing valuable lights, previously little anticipated, upon topics quite unconnected with the origin and attributes of zoological or botanical species." In particular, this author suggested that concerned citizens enlist evolutionary theory to mediate debates about women's proper role in society.<sup>53</sup> *The Descent of Man* (1871), in particular, framed the debate over the higher education of women in important ways. First, the theory that physical structures correlated with mental ones, and the concomitant idea that women's mental inferiority could be read on their bodies, owed much to the ways in which scientists and laypeople interpreted Darwin's work. In *The Descent of Man*, Darwin was primarily concerned with the origin of secondary sex characteristics, though he made several influential statements about the intellectual differences between the sexes. For example, he explained that over the course of many generations, male-versus-male competition for female mates, together with the male's greater participation in the struggle to survive, had forced men to develop more complex and varied skills than women, who simply waited to be charmed and protected. "There can be little doubt that the greater size and strength of man," explained Darwin, were due to eons of males competing "in the general struggle for life and in their contests for wives."<sup>54</sup>

To evolutionists, not only were women's hips designed for the production of offspring, so too were their thoughts and emotions. George Romanes, Darwin's friend and advocate, explained that "the maternal instincts are to woman perhaps the strongest of all influences in the determination of character."<sup>55</sup> So different were the resulting male and female intellects that Romanes suggested "in the animal kingdom as a whole the males admit of being classified, as it were, in one psychological species and the females in another."<sup>56</sup> To Romanes, women's inferior intellect was not a flaw but rather an evolutionary necessity for the creation of healthy offspring. Writing in *Popular Science Monthly*, M.A. Hardaker, a female author, concurred that since maternity took up "twenty percent of the energy of women between twenty and forty years of age," intellectual equality was not a goal to be pursued because it would lead to the extinction of the species.<sup>57</sup> With stakes this high, it is no wonder that female education was a defining women's rights issue in the 1870s and 1880s.

Women's intellectual capacities, according to Darwin and most other

evolutionists, were permanently limited by their reproductive functions, which drew the lion's share of their energy and of evolutionary attention.<sup>58</sup> Thus, over many thousands of years, Darwin concluded, "man has ultimately become superior to woman." "It is, indeed, fortunate that the law of the equal transmission of characters to both sexes has commonly prevailed throughout the whole class of mammals," Darwin noted, "otherwise it is probable that man would have become as superior in mental endowment to woman, as the peacock is in ornamental plumage to the peahen."<sup>59</sup> Darwin further believed that, technically speaking, women could possibly be educated to an equal intellectual standing with men over many generations but at too great a cost to the "easy education of our children" and the "happiness of our homes."<sup>60</sup> Even though Darwin himself supported female education, opponents seized upon the peahen quote to argue that educating women went against nature's plan and was ultimately futile, if not injurious.<sup>61</sup>

Darwin's thinking about female education was also indebted to French evolutionist Jean-Baptiste Lamarck (1744–1829). Lamarck's major contribution to evolutionary thought was his theory that traits acquired in one's lifetime, including temperance and intellectual capacity, could be passed on to one's offspring, a theory often referred to as "Lamarckianism." His ideas, although frequently contested, remained plausible until the turn of the twentieth century when they were discredited by the experiments of August Weismann. Many experts, and even more laypeople, believed that habits and acquired traits could be transmitted to the next generation, thereby making education an obvious vehicle for those who wanted to tailor the evolutionary process to fit their goals. The Lamarckian model of heredity also helps explain why evolutionary scientists were so interested in the question of female education: it would be one thing to educate a few exceptional women but quite another to simultaneously improve women's lot for eternity.

Furthermore, evolutionists contended that the extent to which males differed from females, in both physical traits and day-to-day activities, corresponded to their level of evolutionary advancement. In *The Descent of Man*, Darwin asserted that sex differences promoted the evolutionary process by efficiently dividing labor and that the most advanced species were those in which the sexes were the most differentiated. As evolutionists saw it, animals progressed from asexual to sexual reproduction, developing increasingly complicated mating systems as they ascended the evolutionary ladder.<sup>62</sup> At the very top of this ladder were those humans with the most strictly defined gender roles: married couples in which the husband

worked outside the home and the wife tended to children and domestic tasks, couples that also tended to be middle or upper class and white. To those men steeped in evolutionary discourse and the attendant pride in being at the pinnacle of all living things, women going to college threatened to minimize sex differentiation, thwart evolutionary advancement, and diminish white racial superiority.

### "A FAIR CHANCE FOR THE GIRLS"

Scientific objections to the higher education of women reached a crescendo with the publication of Dr. Edward H. Clarke's *Sex in Education, or a Fair Chance for the Girls* (1873).<sup>63</sup> Clarke was a well-respected ear and eye doctor, a Harvard professor, and a member of Harvard's Board of Overseers. He had previously made comments in defense of a group of beleaguered female medical students in Pennsylvania and, as a result, the New England Women's Club invited him to deliver an address. The clubwomen thought they had invited an ally to speak on the subject of "women's fitness for entering practical life." Likewise, Clarke anticipated a friendly audience before whom he could unveil his theory that higher education unfit women for motherhood and made them sick. Both sides thought wrong. Although Clarke had defended the female medical students against the boorish behavior of their male colleagues, he did not think women's bodies could withstand the pressures of college. Clarke's presentation "on the health of women, as affecting steady, persistent mental application" was followed by a heated debate during which a majority of the women challenged his views about the connection between higher education and female illness.<sup>64</sup>

To clarify and expand his points, Clarke published *Sex in Education*, which became one of the most frequently debated and influential works of the 1870s, drawing attention from scientific and medical authorities, the popular press, and women's rights activists.<sup>65</sup> By linking female malaise to female accomplishment, and by tying both to evolutionary progress, this book helped set the tone for debates about the science of sex difference for decades. Clarke's book was nothing short of a national phenomenon. *Sex in Education* went through seventeen editions in thirteen years; it was reviewed in prestigious national periodicals, including the *New York Times*, the *Nation*, and *Popular Science Monthly*; and countless women read it or were evaluated according to its standards. At the newly coeducational University of Michigan, two hundred copies reportedly sold in one day. Future Bryn Mawr President M. Carey Thomas recalled the anxiety of go-

ing to college in the age of Edward Clarke: "We did not know when we began whether women's health could stand the strain of education. We were haunted in those days by the clanging chains of that gloomy specter, Dr. Edward Clarke's *Sex in Education*."<sup>66</sup>

Clarke was inspired to turn his attention away from eyes and ears and towards female physiology by the debate over whether or not to admit women to Harvard, which raged during the early 1870s. Like many of his colleagues, Clarke opposed women's entry into Harvard's classrooms. He based his objections to female education on the Darwinian worldview that sex differentiation was essential to evolutionary progress. As he explained, "differentiation is nature's method of ascent."<sup>67</sup> If men and women were to participate in similar activities and lead similar lives, then the species—or, more specifically for Clarke, middle- and upper-class white people—would suffer. Clarke's antidote to "identical co-educational" institutions, including state universities in the West and women's colleges in the East, was to design an educational system that accentuated sex differences in both structure and content. Specifically, Clarke recommended overhauling educational practices to suit the "periodicity" of females and the "persistence" of males by separating the sexes, limiting the number of hours per day that girls could study, and forcing girls to take off every fourth week of school to coincide with their menstrual cycles.

Clarke grounded his arguments on the popular idea that female menstruation necessarily brought with it decreased mental capacity and energy. According to Clarke's model, women had to choose between developing themselves as individuals and the ability to give birth to healthy offspring. As Clarke explained, "the muscles and the brain cannot *functionate* in their best way at the same moment."<sup>68</sup> Any strenuous mental exertion during girls' developmental years came at the expense of their reproductive potential. If women persisted in seeking higher education during their formative years, Clarke warned that a third gender would evolve: a sexless woman, which he named "agene" and equated with "the sexless class of termites."<sup>69</sup> As evidence, Clarke drew on his observations of women and related anecdotes from male colleagues.

Feminist men and women recognized the threat *Sex in Education* posed to female advancement and organized a powerful counterattack that reshaped debates about women's physiology and about how science should be practiced. For starters, Clarke's opponents pointed out that the ramifications of his plan extended far beyond schools because he defined education broadly as "comprehending the whole manner of life, physical and psychological, during the educational period."<sup>70</sup> What was at stake in these debates,

then, was not just female admission to college but whether or not women could pursue any interests outside the home. As Drs. George and Anna Manning Comfort pointed out in their response, Clarke's plan would ultimately dismantle female education because "it would be impossible to organize schools in which every pupil is to refrain from study, or from class exercise, for from four to seven successive days in each month."<sup>71</sup> Without an educated female labor pool, job opportunities would be greatly diminished and women would be further tethered to home and hearth. The danger of *Sex in Education*, according to Eliza Bisbee Duffey, one of Clarke's most trenchant critics, was that this book "is more than it seems to be. It is a covert blow against the desires and ambitions of woman in every direction except a strictly domestic one."<sup>72</sup>

*Sex in Education* also prompted women's rights activists to question what exactly constituted scientific evidence and who could speak authoritatively about women's bodies. Many of the nation's most famous women rallied in opposition to Clarke. At least four books, one novel, and dozens of articles and speeches refuted *Sex in Education*.<sup>73</sup> Many questioned his methods and demanded more evidence; others thought that he had misunderstood menstruation or had no business talking about it in the first place. In response to what they considered to be Clarke's outrageous and dangerous assertions, women demanded more female physicians, the right to speak for themselves and their bodies, and a verifiable scientific account of sex difference, not the cobbled together compilation of secondhand anecdotes that Clarke offered.

The most common and effective response to *Sex in Education* was to question Clarke's evidence and call for more studies. Ironically, it was Darwin who provided Clarke's detractors with the gold standard of exacting scientific research. Prominent women's rights activist Thomas Wentworth Higginson led the charge against Clarke in the pages of the *Woman's Journal*, observing, "Darwin offers his basis of facts as modestly and as amply as if he were an unknown man; and proceeds step by step, still fortifying himself, or stating frankly where he is unfortified." This was in contrast to Clarke, who "by no means comes up to the recognized standard of science either in the quantity or the quality of the facts on which he bases his argument."<sup>74</sup> The "standard of science" was still being worked out in the 1870s, but to many readers it was clear that Clarke's methods were not satisfactory.

Antoinette Brown Blackwell helped orchestrate the response to *Sex in Education* and craft the feminist approach to evolutionary science more broadly. To Blackwell, women's involvement in science did not necessarily

mean conducting laboratory experiments or attaining scientific degrees, although that was certainly one way women could be involved. What she really wanted was for women to keep abreast of the latest scientific research and measure it against their own standards. Did scientists' statements about women accord with women's own experiences? If not, then women needed to correct the record and speak for themselves. She trusted that women's case would be safe with science, as long as science included the voices and experiences of women. To counter Clarke, she cited her own twenty-four years as a student in coeducational facilities and the fact that she had always been in good health.<sup>75</sup> The *Westminster Review* lauded Blackwell's section on Clarke in *The Sexes throughout Nature* as "the most convincing," largely because her experiences as a college graduate and mother spoke for themselves.<sup>76</sup>

Galvanized by *Sex in Education*, many women heeded Blackwell's call to speak authoritatively about their bodies, countering Clarke's litany of female malaise with their own stories of good health. Instead of relying on doctors to speak for them, women queried female college graduates or wrote about their own lives. Nearly all of the respondents noted never feeling healthier than they did in college.<sup>77</sup> Elizabeth Cumings, for one, argued that education kept women mentally and physically healthy and helped them avoid hysteria and other mental disorders.<sup>78</sup> Similarly, many university officials claimed that Clarke misrepresented the situation at their schools where women were doing just fine, in body and in mind. In addition, the *Woman's Journal* published testimonies from college professors, administrators, health professionals, and female graduates affirming that, on the whole, college women were healthier than their less-educated peers and that, if anything, education and exercise kept them that way. In contrast to the indirect and often anonymous testimony that Clarke provided, these first-person accounts proved a potent weapon.

Other women rejected the crass, reductive way in which their bodies and lives were dissected by someone with no firsthand experience.<sup>79</sup> In addition to her direct response to Clarke, *No Sex in Education*, Eliza Bisbee Duffey also wrote an advice book for women that emphasized her female perspective.<sup>80</sup> According to Duffey, "men have had their say. It is but fitting that a woman should have hers, especially as the woman who assumes to speak does so with an authority man cannot venture to claim." As a woman, wife, and mother, Duffey felt that she had superior qualifications to those "possessed by any man, professional or otherwise." Further emphasizing this point, Duffey used a variant of the word "woman" three times in the title of her advice book: *What Women Should Know*,

*A Woman's Book about Women*. Duffey wrote the book because she had become "exasperated" when "these champions [of woman's sphere] insist upon making this weakness of mind and body constitutional—something inherent in the sex."<sup>81</sup> "Can a natural state be called a state of invalidism?" asked Duffey. Healthy women, she argued, experienced no distress during menstruation and "should themselves decide as to their capabilities."<sup>82</sup> She hoped her advice book would be a first step in this process.

What finally undercut Clarke's argument about the taxing nature of menstruation was the historic research conducted by Dr. Mary Putman Jacobi, the pioneering female physician and lecturer at the Woman's Medical College of the New York Infirmary for Women and Children. Owing to the popularity of Clarke's book, Harvard University chose the following question as the topic for its prestigious Boylston essay competition in 1876: "Do women require mental and bodily rest during Menstruation; and to what extent?"<sup>83</sup> In fact, the Boylston Prize committee questioned Clarke's research methods and hoped that the contributed essays would shed more reliable light on this important topic.<sup>84</sup> Entrants submitted their essays anonymously, and Jacobi recognized the potential for a judicious outcome. With the help of her colleagues, she surveyed hundreds of women about their menstrual cycles, levels of exercise and activity, and amount of suffering. She then submitted the essay, "The Question of Rest for Women during Menstruation," to the competition. Out of the 268 women who completed her survey, ninety-four reported being "completely free from discomfort during menstruation" and twenty-eight said that they suffered only slightly or occasionally. Overall, a majority of respondents did not experience significant discomfort during menstruation. Based on these extensive surveys—by far the largest of the time—Jacobi concluded that most women did not suffer during menstruation and that those who suffered the least were the most active, both physically and mentally. Conversely, the women most likely to suffer menstrual pain were those with little formal education or those enrolled in "ornamental" education, such as finishing school. Jacobi concluded, "*There is nothing in the nature of menstruation to imply the necessity, or even the desirability, of rest, for women whose nutrition is really normal*" (italics in original).<sup>85</sup> Jacobi won Harvard's Boylston Prize, soundly discrediting Clarke's thesis that women needed to rest while menstruating, as well as his anecdotal methods and moralistic tone.

Jacobi's study of menstruation was also a foray into the ongoing cultural conversation regarding the definition of science. According to Jacobi biographer Carla Bittel, Jacobi "consciously asserted her technical achieve-

ments and condemned the failures and inadequacies of her rivals. She directly confronted work she deemed unscientific, especially the work of the infamous Edward Clarke.<sup>86</sup> In a preliminary paper she wrote in response to Clarke, Jacobi discredited Clarke's findings by linking them to ideology, not science. As she noted, Clarke's theory "appeals to many interests besides those of scientific truth."<sup>87</sup> In her Boylston Prize-winning essay, Jacobi convinced the Harvard judges by using "statistics, diagnostic laboratory tools and the science of nutrition," which she correctly assumed her learned audience would value.<sup>88</sup> Thus, as Bittel persuasively argues, Jacobi's victory in the Boylston Prize contest did not signal the prize committee's support for women in higher education as much as it indicated that they shared her definition of science as laboratory and experiment based.

Following suit, the scientific and medical community, by and large, responded positively to Jacobi's essay, especially because it epitomized the emerging consensus about how science should be practiced. Subsequently, many other researchers copied her methods, but most rejected her conclusions about the healthfulness of women's higher education and about menstruation. According to Bittel, Jacobi felt slighted by the response to her prize-winning essay and was "very disappointed that a large body of her work, specifically her subsequent articles on menstruation, had been ignored." Nevertheless, her research shaped the parameters of scientific practice and laid the foundation for the science of feminine humanity that she and other leading women had long imagined. Though she did not live to see it, Jacobi remained convinced until her death in 1906 that "science would one day lead to social emancipation" for women.<sup>89</sup>

### THE BRAIN SIZE DEBATES

As a woman who took science classes at Columbia University in the 1870s and engaged in feminist activism in the 1880s, Helen Hamilton Gardener was surely familiar with the Clarke debates and with Jacobi's research. While living in New York City, Gardener also befriended freethought leader Robert Ingersoll, the "Great Agnostic" and the most popular speaker on the lecture circuit. Ingersoll encouraged Gardener's ambition and atheism, and she embarked on speaking tours of her own. Known as "Ingersoll in Soprano," Gardener railed against the sexual double standard and criticized the Christian church for fostering the subjugation of women.<sup>90</sup> Gardener was not actively involved in the women's rights movement, however, until one of her essays caught the attention of suffrage leaders. As a student of science, Gardener had become incensed by the popular theory that

women's intellectual inferiority could be read on their supposedly smaller and less developed brains. In 1887, she turned her attention to convincing the public, especially women themselves, that women's brains were in no way inferior to men's and that female physiology did not limit women's mental powers.

When Mary Putnam Jacobi refuted Clarke's theory about the taxing nature of menstruation, the debate over female education shifted from the symptoms of women's periods to the size and structure of their brains. If menstruation did not explain women's intellectual inferiority, then surely their smaller, less developed brains did. The year after *Sex in Education*, Edward Clarke published a book elaborating on British physician Henry Maudsley's theory that sex differences were evident in brains as well as bodies. In *The Building of a Brain* (1874), Clarke slightly modified his recommendations from *Sex in Education*. Now he suggested that girls, as well as boys, not study more than six hours a day and that domestic and technical education be interfered with only in "exceptional cases." While menstruating, "all girls would require a periodical remission of variable length, from the labor of physical education, such as gymnastics, long walks, and the like; and also all would require a remission from the labor of social education, such as dancing, visiting, and similar offices."<sup>91</sup> Noticeably absent from this list of activities to be avoided during menstruation were study and mental exertion. His book, however, aimed to convince readers that brains were indeed sexed and needed to be developed along separate male-female educational tracks. According to Clarke, male brains were charged with the "command [of] a ship;" women's brains with the "govern[ance] of a household."<sup>92</sup> Fundamentally, then, Clarke's argument in *The Building of a Brain* mirrored that of *Sex in Education*, though he gave women slightly more leeway to study and refrained from disparaging comments about manly spinsters.

For evidence about the female brain, Clarke drew heavily on the work of Dr. William A. Hammond, a prominent neurologist with a keen interest in the differences between male and female brains. After treating scores of injured soldiers as Surgeon General of the U.S. Army during the Civil War, Hammond focused his professional attentions on diseases of the mind and nervous system.<sup>93</sup> He founded the American Neurological Association and later served as its president. Through his research on nervous disorders, he became convinced that there was a link between female education and mental breakdown. As he explained to Clarke, "It falls to my lot to see a good many young ladies whose nervous systems are exhausted, and thus rendered irritable, by intense application to studies for which their minds

are not suited." He recalled in particular one young female patient who "was compelled to study civil engineering and spherical trigonometry,—subjects not as likely to be of use to her as a knowledge of the language of Timbuctoo." Schools such as hers, Hammond charged, "do more to unsex women than all the anomalies who prate about the right to vote, and to wear trousers."<sup>94</sup> For evidence Hammond, like Clarke, drew heavily on anecdotes of patients he had seen or heard about from colleagues, not on blind laboratory studies or surveys judiciously interpreted.

Throughout the 1870s and 1880s, as Gardener studied science and delivered fiery speeches on the lecture circuit, Hammond honed his theory about the differences between male and female brains. Ultimately, he determined that female brains were structurally different from, and inferior to, male brains in nineteen distinct ways, including weighing on average five ounces less (Hammond claimed "the larger the brain the greater the mental power of the individual"), displaying less distinct convolutions, and possessing thinner gray matter.<sup>95</sup> These differences in brain structure, according to Hammond, explained women's failure to attain intellectual or professional prominence. He argued that "grave anatomical and physiological reasons demand not only that the progress of [the women's rights movement] should be arrested, but that, contrary to the ordinary course of procedure in other revolutions, this one should go backward."<sup>96</sup> Women had advanced beyond what their inferior brains were capable of handling. While women's brains were "perfectly adapted to the proper status of woman in the established plan of nature," such brains "would inevitably make the worst legislator, the worst judge, the worst commander of a man-of-war."<sup>97</sup> In short, women were intuitive not abstract, imitative not original, and emotional not reasonable. Such descriptions of female intellect were common in the nineteenth century, Darwin himself said as much, but Hammond was the first to link female inferiority to the structure of the female brain.<sup>98</sup> Ten years after women beat back Clarke's biased studies of menstruation and education, they were faced with an analogous argument based on the weight and structure of their brains.

For as long as Hammond had been expounding on the inferiority of the female brain, women had been responding to him in the pages of popular journals and from the podiums at women's rights conferences.<sup>99</sup> Hammond had raised their ire not only through his statements about brain structure but also because of his opposition to women's suffrage and his characterization of women's rights activists as "short-haired women and long-haired men" who were "disappointed in their efforts to get husbands or wives, or else unhappy in their domestic relations."<sup>100</sup> Throughout the

1870s and 1880s, Antoinette Brown Blackwell, Elizabeth Cady Stanton, and others denounced Hammond at every opportunity.<sup>101</sup> Blackwell, for instance, argued that men's brains were bigger only because they needed to control men's larger bodies and that women made up for their smaller brains by having more complex nervous systems.<sup>102</sup> Stanton pointed out that scientific descriptions of women's brains lacked the scrupulous attention to experimentation and method that characterized other scientific work.<sup>103</sup> Others contended that if brain size did indicate intelligence, elephants would be the leaders of men and giants would rule the planet. At the same time, scientists promoted analogous arguments about the "inferior" brains of African Americans and other people of color, though the women who critiqued Hammond failed to make this connection.<sup>104</sup>

Debates about female brains did not take center stage, however, until 1887, when Hammond delivered a speech entitled "Brain-Forcing in Childhood," which was subsequently reprinted in *Popular Science Monthly* and numerous other periodicals.<sup>105</sup> Hammond's main point in "Brain-Forcing in Childhood" was that all students, regardless of gender, were forced to study too much and learn too many subjects at the same time. This system, he claimed, was especially pernicious for girls. Girls, according to Hammond, should stick to learning subjects to which they would be naturally called as mothers. For evidence, he cited the "comparative anatomy and physiology of the male and female brain." Key to his argument was the idea, grounded in Darwinian evolutionary theory, that the more advanced the species, the more distinct roles between male and female. Among humans, Hammond noted that "the skull of the male . . . is of greater capacity than that of the female, and it is a singular fact that the difference in favor of the male increases with civilization."<sup>106</sup> Thus, if women's brains were to evolve to be more like men's, this would actually be an evolutionary setback.

Helen Hamilton Gardener read this address and picked up her pen. She responded to Hammond in the pages of *Popular Science Monthly*, sparking several months of back-and-forth debate in the letters to the editor section. Their exchange highlights the contested status of nineteenth-century science and the high stakes for women in determining how science would ultimately be defined and practiced. Much like Mary Putnam Jacobi's response to Clarke, Gardener objected to Hammond's methods as much as to his sexist findings—findings that she suggested were based on "assumption and prejudice" rather than "scientific facts and discoveries."<sup>107</sup> To Gardener, Hammond's arguments were particularly dangerous because they carried the cultural authority of coming from a nationally respected

scientist: "the writings of such a man, aided by the circulation and prestige of the leading journals of the country, which publicize them as authoritative, must inevitably influence school directors, voters, and legislators and go far to crystallize the belief that facts are well known to the medical profession, with which it would be dangerous to trifle."<sup>108</sup> But trifle she did.

Unable to conduct experiments on human brains herself, Gardener tested Hammond's findings by submitting a list of questions to twenty of the nation's top brain specialists, all of whom referred her to the leading expert on brain anatomy, Dr. Edward C. Spitzka, a prominent neurologist and anatomist in New York City. Having "previously discovered that even brain anatomists are subject to the spell of good clothes," Gardener put on her "best gown" and requested a meeting with the notoriously elusive and short-tempered Dr. Spitzka. Spitzka was impressed with the thoroughness of her questions and with the topic of her query, and the two struck up a vibrant exchange that formed the basis of her rebuttal to Hammond.<sup>109</sup> In particular, Gardener asked Spitzka if brain anatomists could identify the sex of individuals simply by looking at their brains (Hammond worked the opposite way—he knew the sex of the brains he studied and then asked what were their distinctive features). Since Hammond placed such emphasis on the size and structural differences between male and female brains, Gardener thought this would be a logical test of his theory. What prompted Gardener to investigate the claim that "there were natural anatomical differences between the brains of the sexes of the human race" was that no one made similar claims about the brains of "lower animals."<sup>110</sup> A firm believer in evolution, she found it incongruous that the brains of humans would develop so unlike those of other species. As a further test of nature versus nurture, Gardener asked whether brain specialists noted structural differences among infants' brains. Spitzka and the other experts informed her that they could not possibly determine the sex of an infant's or an adult's brain simply by looking at it. By establishing that scientists could not distinguish male and female brains by sight, Gardener hoped to bolster the idea that if any sex differences in brains existed, they were cultural, not biological.

In her letters in *Popular Science Monthly*, Gardener also stressed that, logically, Hammond's arguments made no sense. If, as he claimed, men's brains became increasingly advanced as civilization progressed, then men's brains were clearly benefiting from cultural changes—not biology. Thus, it made no sense to deny women access to these same cultural resources on the grounds that their brains "naturally" could not handle

higher education. Furthermore, she noted if the differences between male and female brains were natural, they should be present in all races and groups of people, not only in the most civilized as Hammond claimed. To give him the chance to prove his point once and for all, Gardener proposed a challenge: if Hammond could successfully determine the sex of twenty brains she provided for him, borrowed from the collections of her brain anatomist friends, she would forever rest her case. Hammond replied that this challenge was preposterous and suggested, instead, that he provide her with twenty thumbs and ask her to identify the sex of the person from whose hand they came. The editors of the *Woman's Tribune* cheered Gardener from afar, declaring that if Hammond did not accept her challenge "we want to hear nothing more from him on the subject of woman's inferiority."<sup>111</sup>

The letters between Gardener and Hammond demonstrate the extent to which the emerging standards of scientific practice, above and beyond brain anatomy, formed the crux of the debate as each tried to establish that the other was not scientific enough. Throughout their sparring, Gardener positioned herself as the voice of reason and a force for truth but also as a self-conscious outsider to the scientific establishment. She did not mention her scientific courses at Columbia, nor did she reference published scientific studies that might have contradicted Hammond's or mimic Hammond's scientific tone. Rather, she wrote clearly, almost lawyerly, relying on logic and classical rhetoric to critique Hammond's claims, point by point. In his reply to Gardener's brain challenge, Hammond mocked her twenty leading brain specialists, insinuating that they were imaginary, and he critiqued the tone of her letter for its "unscientific spirit." Throughout his responses, Hammond cited his insider knowledge of brain anatomy and his familiarity with previous research and other researchers, and he chided Gardener for not being a member of the club, so to speak. Gender, of course, was an important subtext of his attacks. For example, he criticized Gardener's "feminine" proclivity for using italics and noted that she displayed the "defective logical power" so characteristic of female minds.<sup>112</sup> Gardener responded with more evidence and logical rebuttals to Hammond's anecdotes.<sup>113</sup> In closing, Hammond lamented having given Gardener more attention than she deserved and advised Gardener and her brain anatomists that "before they again rush into print they make themselves to some extent acquainted with the elementary truths of the science of anthropology."<sup>114</sup> In response, Gardener strenuously objected to the claim that anthropology was a science. A distrust of anthropology and anthropologists—the main source of evidence on which Hammond drew



(including the work of Carl Vogt and Paolo Mantegazza)—pervaded Gardener's replies. As she pointedly noted in her second letter to Hammond, "[S]ince the science of anthropology is as yet in its infancy; since its various students disagree; and since within the past few months one of its cardinal principles has been found to be unsound, I am all the less willing to accept the sweeping statements of Dr. Hammond."<sup>115</sup> Gardener intimated that she had more faith in the hard sciences, those involving laboratory study and dissection, rather than in the soft sciences, which relied more heavily on the investigator's observations and secondhand anecdotes, although in the 1880s the distinction between anthropology and the experimental sciences was not yet firmly established, and Darwin, too, drew on many anthropological studies.<sup>116</sup>

To Gardener, science meant impartial interpretation of experimental results, which was why she thought her brain identification challenge provided the ideal rebuttal to Hammond's questionable claims. But this challenge raised a separate methodological question: should women and men be evaluated as members of a group or as individuals? Hammond refused the brain identification challenge on the grounds that it was impossible to distinguish differences between individual brains—what mattered were the aggregate differences between men and women. As a counteroffer, he suggested that they weigh one hundred male and one hundred female brains and then compare the averages, a test he was confident would prove that male brains weighed, on average, more than female brains. Relying on averages, not individuals, he noted confidently, was the way "all such determinations are made by those who know what they are about." He then lobbed a final challenge to Gardener: he listed several eminent men whose brains each weighed more than fifty-six ounces, daring her to find even one female brain that had ever surpassed this mark.<sup>117</sup>

Gardener did not engage Hammond's suggestion that they compare average brain weights, but she took on his individual brain weight challenge in earnest. She wrote a popular essay detailing her critique of Hammond entitled "Sex in Brain," which she was invited to deliver at the 1888 International Council of Women held in Washington, D.C., to commemorate the fortieth anniversary of the Seneca Falls Women's Rights Convention. The world's leading women's rights activists attended, and, despite the fact that Gardener had not previously been involved with the movement, the organizers allotted her a keynote spot, testifying to the extent to which the women prioritized science.<sup>118</sup> Gardener did not disappoint.

In her address, Gardener delivered a powerful argument about the possibilities and limitations of science. Women, she exhorted, "had hailed sci-

ence as their friend and ally" only to be met with "pseudo-science" that "adopted theories, invented statistics, and published personal prejudices as demonstrated fact."<sup>119</sup> Gardener further suggested that science as practiced by many male scientists simply dressed up age-old religious ideas of female inferiority in modern scientific language, explaining that she had found that "a man's religious leanings inevitably color and modify all of his opinions, and govern his entire mental outlook."<sup>120</sup> Some of the brain specialists she contacted for her study performed "mental gymnastics" to make it seem as if their scientific findings adhered with their religious beliefs and "gave a black eye to their facts in preserving a blind eye to their faith."<sup>121</sup> Nothing, according to Gardener, could taint a man's scientific practice more than a belief in the Genesis creation story. Orthodox believers, no doubt, considered "'Adam as a creature after God's own heart and in his image,' and therefore capable and deserving of all opportunity and development for and because of himself, and to promote his own happiness." Whereas Eve became a "mere bone or rib of contention as it were, between man and man." "The more literal and consistent his faith," charged Gardener, "the less likely is he to deal with woman as an intellectual being, capable of and entitled to the same or as liberal, mental, social, and financial opportunities or rights as are universally conceded in this country to be the birthright of man."<sup>122</sup> The problem then was not science but science improperly practiced owing to the lingering influence of the Genesis creation story and its insistence on inherent female inferiority.

In contrast to men like Hammond who employed questionable methods and who let religious ideology taint their scientific research, Gardener held up Edward Spitzka as the epitome of a modern scientist. Spitzka, she explained, had in his laboratory "brains from those of a mouse to those of the largest whale on record." Gardener was also impressed with Spitzka's laboratory equipment that enabled him to show her "the peculiarities of brains as shown by microscopes and scales," and she appreciated that he "looked up points in foreign journals to which I had not access." Perhaps most important to Gardener, Spitzka demonstrated the ways in which empirical science could be helpful to women. Spitzka, she noted, "does not himself believe in the equality of the sexes, but he is too thoroughly scientific to allow his hereditary bias to color his statements of facts on this or any subject." Gardener concluded, "in the hands of a man who has arrived at that point of mental poise and dignity, our case is safe, no matter what his sentiments might be."<sup>123</sup>

Despite Gardener's hope in science as a vehicle for promoting women's rights, she stopped short of encouraging women to engage in scientific

study or research themselves. She saw the boundaries of specialization and academic credentials barring women's access to scientific research, noting that few women "had the anatomical and anthropological information to risk a fight on a field which assumed to be held by those who based all of their arguments upon scientific facts, collected by microscope and scales and reduced to unanswerable statistics."<sup>124</sup> Instead, she implored women to be more informed and critical consumers of scientific knowledge, to question what they read, and to distinguish the good scientists from the bad. And, like Blackwell, she encouraged women to contribute their experiences and their bodies to science to make sure that the scientific record represented them.

What most troubled Gardener about Hammond's argument was that scientists had yet to study the brains of any remarkable women. Instead, they compared the brains of anonymous women who had died in state hospitals, or on the streets, with those of statesmen, writers, and other men of international renown. To even the scales, she implored her peers at the 1888 women's rights convention to consider donating their brains to science. "I sincerely hope that the brains of some of our able women may be preserved and examined by honest brain students, so that we may hereafter have our Cuviers and Websters and Cromwells," intoned Gardener. "And I think I know where some of them can be found without a search-warrant—when Miss Anthony, Mrs. Stanton, and some others I have the honor to know, are done with theirs."<sup>125</sup>

Elizabeth Cady Stanton heeded the call. After hearing Gardener's "Sex in Brain" speech, Stanton declared, "The paper read last night by Helen Gardener was an unanswerable argument to the twaddle of the scientists on woman's brain. The facts she gave us were so encouraging that I started life again this morning, with renewed confidence that my brain might hold out a few years longer."<sup>126</sup> This meeting solidified an intimate and sustaining friendship between Stanton and Gardener, two outspoken freethinkers. They supported each other's agnosticism and remained close friends and allies until Stanton's death.<sup>127</sup> They also took an important oath together: Stanton and Gardener pledged to each other that upon their deaths they would donate their brains to science so that, for the first time, researchers might compare the brains of eminent women with those of eminent men.

When Stanton died in 1902, she had indeed planned for her brain to go to Cornell University's Burt Wilder Brain Collection for dissection, and her signed brain bequest form remains in the Cornell archives. In 1887, Gardener had sent her a note, signed "Heathen Helen," asking her to donate

her brain and convince her family to honor her bequest. On the back of this note, Stanton instructed her children: "you must save my brain for Heathen Helen's statistics."<sup>128</sup> Gardener publicly explained Stanton's wishes in a memorial address: "Mrs. Stanton asked me, in case she should go into the silence before me, if I would speak for her—at her grave. . . . First, she wished it known that she died as she had lived, a fearless, serene agnostic." Gardener lauded Stanton's decision to donate her "tireless brain" to Cornell University "that it might serve Science and mankind in helping to arrive at the truth, after death, as it always had done in life." According to Gardener, Stanton "felt that a brain like hers would be useful for all time in the record it would give the world, *for the first time*,—the scientific record of a thinker among women." Stanton hoped that her brain would contribute to "the fine heritage of all women" and be her "last and holiest gift."<sup>129</sup> But Stanton's heirs balked at this request and denied, mistakenly, that their mother had ever agreed to donate her brain to science.<sup>130</sup>

In the early 1900s, the idea that brain size corresponded with intelligence came under sustained attack. While skeptics had pointed out flaws in the theory in the nineteenth century, consistent empirical data to discredit the brain-weight theory of intelligence did not emerge until the social sciences, particularly psychology, took up the question. Historian Cynthia Eagle Russett credits the work of Alice Lee, then a graduate student studying under Karl Pearson at the University of London, with creating a formula for establishing skull capacity and then applying this formula to enough skulls, those of male anatomists who had volunteered, to establish that there was no clear link between brain size and intellectual capacity. Lee published her findings in 1902, and her mentor followed up with similar studies that same year.<sup>131</sup> Then, in 1909, Johns Hopkins anatomist Franklin Mall applied new statistical measures to the study of the frontal lobe and fissures of the brain, areas that had long been associated with both racial and sex differences. Mall found no differences between male brains and female brains, concluding, "[T]he general claim that the brain of woman is foetal or of simian type is largely an opinion without any scientific foundation." He further elaborated that any assertion "regarding male and female types are of no scientific value."<sup>132</sup> Mall's research and tone indicated that any supposed differences between male and female brains had come from the assumptions of male scientists rather than the female brains being dissected. But, still, no prominent woman's brain had been examined.

When Gardener died in 1925, she was a widow without children or other meddling heirs to derail her plans. Within hours of her death at

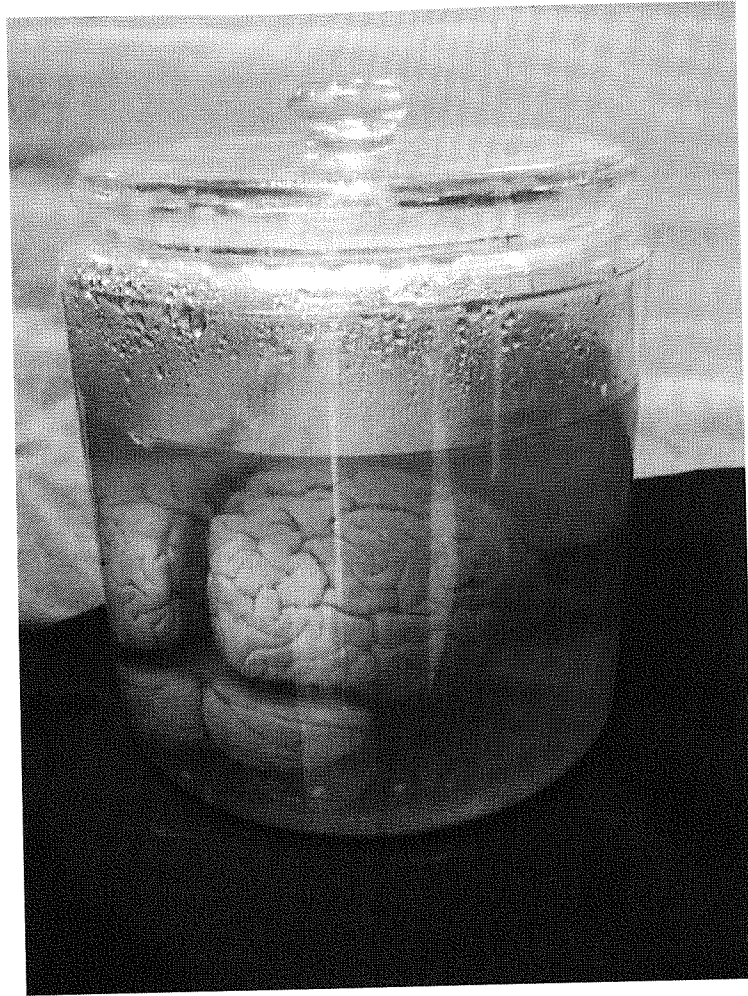


Fig. 2.3. Helen Hamilton Gardener's brain on display at Cornell University, 2013. Courtesy of the Burt Wilder Brain Collection, Department of Psychology, Cornell University. Photo credit: Sheila Ann Dean.

Walter Reed Hospital, Army Major Frank D. Francis packaged her brain and shipped it to Cornell's brain collection, where it remains on display today (fig. 2.3).<sup>133</sup> In her will, Gardener explained that in 1897 Burt Wilder, the founder of the Cornell brain collection that bears his name, had invited her to submit her brain as a "representative of the brains of women who have used their brains for the public welfare" and that after having spent her life "using such brains as I possess in trying to better the condi-

tions of humanity and especially of women" she was happy to grant this request.<sup>134</sup>

Dr. James Papez, the curator of the brain collection in 1925, dissected Gardener's brain and published his exhaustive findings in the *American Journal of Physical Anthropology*. To modern readers, his fifty-page report contains so many measurements, comparisons, and qualifications—he literally dissected every millimeter of Gardener's brain—that his whole project seems absurd. In other words, it was exactly the kind of empirical study that Gardener criticized Hammond for not conducting and that she hoped might one day be the norm. Among the many figures recounted in his detailed description of Gardener's brain, Papez found that her brain had a lower "precuneal index" than the average female, whose precuneal index is lower than the average male's, but that she had a "remarkably high" occipital index. Ultimately, however, "the differences in the size of the medial frontal region in the two sexes is about .9 and is not sufficient to explain the difference that exists between the precuneal and occipital indexes of the two sexes."<sup>135</sup> But to Papez the message was clear.

In this maze of measurements, in which some women exceeded some men some of the time, but not always, and vice versa, Papez determined that Gardener's brain was in fact highly developed, in correspondence with her many achievements, and that "sex differences [were] exhibited to a lesser degree than in other female brains."<sup>136</sup> He did not proclaim the absence of sex in brain; he simply found Gardener's brain to be less sexed than those of the forty other female brains in his collection. He also noted that her brain weighed fifteen hundred grams, which "must be considered reasonably high for a woman whose normal weight was 106 pounds," even though it was just under the fifty-six ounce mark of true greatness that Hammond had set in 1887. Papez included several mentions of Gardener's brain weight, perhaps sensing that many readers would want to know, but he clarified that "no great value can be assigned to brain weight alone," and he made no mention of Hammond.<sup>137</sup> Throughout the article, Papez was sensitive to the fact that he was not just commenting on Gardener's brain but that, in keeping with her wishes, he was offering the latest contribution to the long-standing question of whether or not there were observable sex differences in human brains.

With regard to this larger question about "sex in brain," Papez was much more tentative and speculative than his nineteenth-century forefathers—just as Gardener would have wanted. Papez included a lengthy subsection on "sex differences in the brain" where he presented a thorough overview of previous research (not including Hammond) and refrained

from making any generalizations about either women's brains or their capabilities. He ultimately concluded that the "chief sex difference is in the smaller size of the female precuneus" and that the "parietal (precuneal) index [was] greater in the males."<sup>138</sup> But relative to this finding he wondered if there was a "somatic sex area" in the brain that controlled the sex organs and that might explain any corresponding structural differences.

If sex had not hampered the development of Gardener's brain, were there other inherited or environmental factors that might explain its high development? On this, the answer was clearly yes. In analyzing and explaining the various features of Gardener's brain, Papez often relied on assumptions about race and class and even grouped his comparative brain samples—forty female and forty male from the Cornell collection—into "high, middle, and low class" groups. He explained that these classes corresponded with achievement, but they very well might have also correlated with economic class and race. For example, he reported that Gardener's "postcentral gyrus" was well developed, as was common "in the brains of the higher class."<sup>139</sup> Furthermore, Papez drew insight from her race and genealogy, noting "she has in her ancestry two eminent lines of descent through Cromwell and Calvert (Baltimore) families. It is evident that a great mental talent resided in these families who combined the bloods of the Anglo-Saxon and Celtic races—a talent which was possibly inherent in her particular mental structure."<sup>140</sup> As a descendent of Lord Baltimore and Cromwell, of course Gardener's brain would be highly capable.

But Papez should not be considered a biological determinist. Throughout the report he also drew on newer theories about the importance of environment and culture in shaping one's destiny. While researchers may have been tempted to look for structural differences in the brain that would explain social realities, Papez cautioned that "so many conflicting statements on the association of a more complex degree of cerebral development with intellectual attainment have been made that many recent authors have been inclined to skepticism. . . . A large number of problems of cerebral morphology as correlated with anthropology will have to be solved before useful opinions can be entertained."<sup>141</sup> Papez then stated matter-of-factly that even though achievement was most certainly a result of "nervous function," it was also a matter of environment and opportunity: "besides brain function there are so many environmental factors that have been instrumental in producing men of eminence or renown, it would seem rash to argue that brain structure alone is an adequate explanation or that any peculiar wealth of matter is limited to such people."<sup>142</sup> Yet,

even though Papez was careful not to generalize, his report found many more brain differences according to class and race than to sex.

The idea that brains could be classed and raced, but not necessarily sexed, would have appealed to Gardener too, for in many ways that was what she was trying to prove. In lobbying her peers to donate their brains, Gardener, along with Stanton, hoped to align the interests of elite white women with their elite white male peers and distance themselves from poor women, immigrants, and people of color.<sup>143</sup> In disputing Hammond's findings, Gardener questioned the methods by which the brains of female hospital "pickups" had been studied, but she also objected to the fact that brains like hers had not been included. Likewise, she rejected the pseudo-scientific studies of sex differences but also the idea that all women could be grouped in the same category. Race and class, then, played an important role in Gardener's bequest. Gardener did not attempt to overthrow the hierarchical ladder of civilization, based upon evolutionary notions of race, that was so frequently invoked by scientists and anthropologists; rather, she wanted to prove that educated, white women had been placed on the wrong rung.

To Gardener's credit, however, she also had the foresight to imagine the complicated ways that nature and culture might interact, as evidenced by her insistence that the brains of infants (rather than adults) be studied for sex differences to rule out the effects of culture, thereby challenging the very foundation of biological determinism. Since the brains of lower animals did not show marked sex differences, Gardener wondered whether any observable differences in human brains might not be "natural and necessary sex differences" but rather "due to difference of opportunity and environment."<sup>144</sup> Therefore, Gardener's resistance to being grouped with female hospital pickups was not necessarily based on her sense that elite white people shared genetic superiority but, rather, that they shared educational and cultural opportunities, opportunities from which women like herself and Stanton had surely benefited.

As Gardener hoped, her brain did what her pen could not: it established once and for all that her intellect had not been handicapped by her sex. Under the headline "Woman's Brain Not Inferior to Men's," the *New York Times* declared that Gardener's brain "posthumously substantiated her life-long contention that, given the same environment, woman's brains are the equal of man's."<sup>145</sup> What a difference fifty years had made. In the 1870s, the *Times* had recommended that all women study Edward Clarke's findings about the pathology of menstruation and conduct themselves accord-

ingly, but, by 1925, biological determinism had lost sway and the *Times*, together with *Time* magazine and even *Popular Science Monthly*, forthrightly declared that it was possible for women's brains to equal men's, as if few people had ever thought otherwise.<sup>146</sup> Five years after the ratification of the Nineteenth Amendment, the long battle for suffrage was not paramount in American consciousness when the *New York Times* printed their extensive coverage (five stories in all) of Gardener's brain donation. To *Times* reporters and readers, Gardener was not remarkable as a suffrage strategist, much less as an outspoken freethinker, but as an emblem of the type of educated, professional woman who was quickly becoming commonplace.

With the battle for suffrage won and with Hammond's brain theory discredited by the work of Franklin Mall and others, why did Gardener, then the highest ranking woman ever to serve in the federal government, still feel compelled to donate her brain to Cornell in 1925? After all, nearly forty years had passed since the publication of "Sex in Brain." During this time, Gardener had remarried, traveled the world, played a key role in securing women's right to vote, and served admirably on the U.S. Civil Service Commission. Perhaps Gardener insisted on donating her brain because scientific claims about the biological inferiority of women shaped the thinking of those women's rights activists who came of age in the 1870s and 1880s. Perhaps Gardener was also concerned that twentieth-century women's rights leaders had ceded science to the professional (mostly male) scientists and no longer monitored scientific developments as she and her peers had done in the nineteenth century. While the mainstream press granted ample coverage to Gardener's brain donation, the women's press did not, nor did it cover the pathbreaking experiments discrediting the brain size theory of intelligence or those disproving greater male variability (another Darwinian theory enlisted to prove women's natural inferiority) conducted by social scientists Leta Stetter Hollingworth and Helen Bradford Thompson in the 1910s.<sup>147</sup> In the 1870s and 1880s, women's rights advocates had welcomed science into discussions of sex difference and succeeded in overturning the most biased scientific theories, but their success was predicated on vigilant monitoring of and active participation in science, both of which waned after 1890 as a result of structural changes in the women's rights movement and within the scientific establishment.

One wonders what Gardener thought about the women's movement's decision to cease involvement with science and whether her determination to publicly donate her brain to Cornell was as much a call to action to her women's rights colleagues as it was a final foray into the biology

of sex differences. Much like Maria Mitchell, Mary Putnam Jacobi, and Antoinette Brown Blackwell, Gardener knew that women needed science, just as science needed women. Together, these women and their colleagues in the women's rights movement actively shaped the emerging consensus on just how science should be practiced by demanding that scientists structure their studies inclusively, rely on experimental and laboratory evidence (not secondhand anecdotes), interpret their findings objectively, and take seriously the experiences and bodies of women. While she remained hopeful about what objective science might mean for women, Gardener resisted the masculinization of the scientific profession and the contraction of women's rights to focus on the vote. These two transitions shaped the development of twentieth-century science as well as feminist thought, marking the two as mutually incompatible for decades. This is a legacy that Gardener surely would have regretted, for she saw science and feminism as fundamentally allied. Her brain donation represents an alternative to sexist science and unscientific feminism; yet, even though she rejected biological determinism, her bequest also highlights the assumption of white racial superiority that characterized the thinking of many Darwinian feminists and of white Americans more generally. Throughout her lifetime, Gardener witnessed a rash of scientific theories of sex difference come and go, often masking the same conclusions in new studies. She likely suspected that Hammond's theories might one day be resurrected in new garb, as in fact they have been.<sup>148</sup> If so, she understood that her brain might well be women's best defense, both symbolically and literally. As she wrote in her will, "[I]f my brain can be useful to women after I am gone it is at their service through Cornell."<sup>149</sup> One of the ways in which her brain was useful was in its actual study, which substantiated her lifelong contention that women's brains were not hampered by sex. Another way that her brain remains useful is that it reminds those interested in women's rights of the extent to which these rights often hinge on women's bodies, on prevailing definitions of the "natural," and on women's dogged involvement in science. However, as chapter 3 further explores, linking women's rights to women's bodies, and especially to motherhood, has been, historically, a risky strategy as not all women experience motherhood or use their bodies in the same ways.<sup>150</sup> Finally, Gardener's brain bequest illustrates that a central contention of the Darwinian feminists was the right of women, including mothers, to pursue nondomestic tasks and maybe even work outside of the home, another hotly contested debate into which evolutionary science was called as arbiter.