CHAPTER 5

THE RECEPTION OF *THE ORIGIN* AMID INTELLECTUAL FERMENT IN CAMBRIDGE

Historians discussing the reception of Darwin in Cambridge have given the erroneous impression that Louis Agassiz and Asa Gray were the major players in a debate that focused narrowly on the validity of Darwin's theory considered primarily as a biological theory.[1] As we have already shown, sympathy for Darwin's theories in the Harvard community went beyond Gray's articulate and more visible support and dissent extended beyond Agassiz's sharp dismissal. The reality was that Gray was not alone, either as a naturalist or as an intellectual in Cambridge, in his sympathy for Darwin's ideas. He was part of a much broader, more diffuse, and loosely connected intellectual community in Cambridge that was already philosophically attuned to Darwin before they ever read *The Origin*.

The most prominent members of this group of Darwin sympathizers were Jeffries Wyman, Chauncey Wright, Charles Sanders Peirce, Simon Newcomb, John

[1]The irony seems to have been that, rather than stimulate new lines of inquiry into the reception of Darwinism in the United States, the impeccable scientific biographies that A. Hunter Dupree and Edward Lurie have written on Gray and Agassiz have stultified continued and broader studies of additional fruitful themes. The received opinion, as seen in the dearth of modern studies, seems to have been that they had said the last and final word on the subject. They would certainly be the first to deny that they had or ever intended to convey that impression.

Fiske.[2] Each came from different backgrounds, identified with different aspects of Darwin's work, and exploited it in distinctive ways in their subsequent careers. These men were already dissatisfied and restless with the received religious, philosophical, and scientific assumptions of the genteel Boston and Cambridge culture. Except possibly for Jeffries Wyman, they were active participants in the trans-Atlantic ferment that convulsed English orthodox verities in the 1850s.

When this group read Darwin they did so in the context of their growing sympathies for whomever challenged the reigning orthodoxies and championed any strand of the tangled skein of English Positivism. *The Origin*, thus, catalyzed their existing intellectual predispositions; it did not create them. By sketching the course of their intellectual backgrounds down to their reading of *The Origin*, we can gain a much deeper insight into the swirl of ideas that was already existing when the storm over Darwin broke.

Jeffries Wyman

Jeffries Wyman has endured the obscurity of living in the shadow of his two illustrious peers, Gray and Agassiz.[3] Only recently has this self-effacing, gentle man

[2]William James and Francis Ellingwood Abbot joined this group a few years later.

[3]Toby A. Appel has surpassed all previous efforts to situate Wyman in his scientific and philosophical context and assess his historical prominence. See her two recent articles, "Jeffries Wyman, Philosophical Anatomy, and Darwin," *Jour. Hist. Bio.* 21 (Spring 1988), 69-94, and "A Scientific Career in the Age of Character: Jeffries Wyman and Natural History at Harvard," in Clark A. Elliott and Margaret W. Rossiter, eds., *Science at Harvard University: Historical Perspectives* (Bethlehem, PA: Lehigh University Press, 1992), 96-120. My profile of Wyman relies mainly on these two articles.

Paul Jerome Croce explores the larger ferment of ideas in Harvard on the eve of William James residence at Harvard in his superb study, *Science and Religion in the Era of William James:*

begun to emerge from this shadow to assume his rightful place alongside them as a prominent scholar and influential professor in his own right. He had a well-deserved international reputation as a superb and meticulous comparative anatomist. Students may have been attracted to attend Lawrence Scientific School to study with Agassiz, but they soon discovered the unassuming Wyman, with whom they took many courses, to be an admirable mentor. Before Agassiz orchestrated his campaign to build the impressive Museum of Comparative Zoology, the friends and patrons of Jeffries Wyman built a Museum of Comparative Anatomy for him. He served as president of the Boston Society of Natural History from 1854 to 1870; he was in the chair during the Rogers-Agassiz spring debate. It is because of the high regard in which he was held at Harvard and throughout Cambridge and Boston that his road to the acceptance of evolution, if not natural selection, is important to consider.

Wyman was trained in what, at the time, was called "philosophical anatomy."[4] By the early decades of the nineteenth century a number of British and European naturalists, with varying research interests, were growing dissatisfied with the simple tasks of identifying, naming, classifying, cataloguing, and displaying the artifacts of nature. The initial thrill of these activities, which had been enough to sustain

Eclipse of Certainty, 1820-1880 (Chapel Hill: University of North Carolina Press, 1995). Unfortunately, he fails to take advantage of Appel's philosophically nuanced studies of Wyman. Despite this minor oversight, his work remains a model for a fuller, more finely-grained, intellectual history of Darwin's reception in the United States.

[4]The background for "philosophical anatomy" is based on Philip F. Rehbock, *The Philosophical Naturalists: Themes in Early Nineteenth-Century British Biology* (Madison: University of Wisconsin Press, 1983), Part I: The Idealist Approach to Nature, 15-116.

eighteenth-century naturalists, was wearing thin. They wanted their studies to become more "philosophical." That meant moving beyond describing the particular to examine the laws and patterns, the forms and functions, which they were beginning to observe all around them, from anatomy to zoogeography. They wanted, in particular, to emulate the success and sophistication of the physical sciences which, under the inspiration of Newton, had developed the theoretical tools essential to unlocking the secrets of Nature.

In the early nineteenth century Germann and French naturalists and philosophers were forging those theoretical tools from what can loosely be described as *transcendentalism* or *idealism*. The line of inspiration for this movement runs from Plato's belief in temporal, imperfect expressions of eternal, perfect Forms or Ideas to Immanuel Kant's transcendental idealism; it culminated in Goethe who believed that he saw a single unified plan that bound the entire organic realm together. Goethe saw in the great diversity of flowers the successive metamorphoses of a single idealized leaf. This single morphological plan, obviously, was not discovered through the plodding Baconian collection of particulars. It was, rather, seen by the mind's eye. It was a "transcendental" unity that could, under proper philosophical guidance and careful laboratory study, be traced in anatomical, physiological, and osteological studies. It was Goethe's belief in the transcendental unity of all species through a single archetypal plan that motivated Geoffroy St. Hilaire to challenge the strictly

teleological approach of Georges Cuvier in 1830.[5] It also underlay the philosophical attempt of Richard Owen, the great British anatomist, to synthesize their two approaches.[6]

Jeffries Wyman studied with the disciples of both St. Hilaire and Cuvier, and with Owen himself in the early 1840s. Shortly after graduating from Harvard Medical School, thanks to the generous support of John Amory Lowell for a set of Lowell Lectures, Wyman was able to study in Paris for a year, principally at the Museum National d'Histoire Naturelle. There he took courses from the leading figures in botany, comparative anatomy, geology, physiology, and embryology. Though he found these men unattractive personally, he absorbed a great deal from them professionally and philosophically. He found a more congenial spirit in Richard Owen, who was just then beginning to emerge as a leading comparative anatomist at the Hunterian Museum of the Royal College of Surgeons. Just five years prior to Wyman's visit Owen had delivered his famous Hunterian Lectures on comparative anatomy which outlined his own distinctive understanding of "philosophical anatomy"

[5]Appel has thoroughly treated this episode in *The Cuvier-Geoffroy Debate : French Biology in the Decades before Darwin* (New York: Oxford University Press, 1987).

[6]Adrian Desmond has offered a meticulous and sophisticated interpretation of the radical political role that philosophical anatomy played in British politics in the 1830s and 1840s in *The Politics of Evolution: Morphology, Medicine, and Reform in Radical Britain* (Chicago: University of Chicago Press, 1989). Whatever the scientific merits of philosophical anatomy, religious dissidents and disenfranchised workers found biological theories of transmutation very useful in challenging the established social, political, and religious hegemony. These debates were an important context for understanding Darwin's theorizing and strategy for publication.

and the research program he would follow for the remainder of his productive life.[7] Wyman's brief two month stay was enough to convince him that Owen modeled the kind of careful "philosophical anatomist" he aspired to be. They remained in friendly, if infrequent, correspondence until Wyman's death in 1874. Wyman returned to Boston and a subsequent appointment at Harvard as "the best-prepared comparative anatomist in America, well instructed in the latest European morphological thought."[8]

All of Wyman's investigations prior to 1860 were guided by the philosophical anatomy he learned from Owen, though he rarely stated so explicitly. He studied the homologies between the rudimentary optic nerve of blind fish in Mammouth Cave and other vertebrates, explored the homologies between the nervous systems of vertebrates and invertebrates, examined the theory that the skull was formed from three enlarged vertebrae, studied the odd development of the Surinam tadpole that never swam, and the various explanations for human and animal monstrosities. His earliest and, perhaps, most notable and widely known accomplishment came in 1847 with the naming and describing of the "gorilla." These wide-ranging studies all illustrated Owen's claim that the Creator had established a common plan which was then adapted to meet the special needs of each organism.

Wyman's philosophical background and morphological studies prepared him to

[7]Phillip R. Sloan has recently edited, introduced, and commented on these important lectures in *The Hunterian Lectures in Comparative Anatomy, May and June 1837* (Chicago: University of Chicago Press, 1992). Nicolaas Rupke has given us a modern biography of Owen in *Richard Owen: Victorian Naturalist* (New Haven: Yale University Press, 1994).

[8]Appel, "Jeffries Wyman, Philosophical Anatomy, and Darwin," 76.

sympathize with Darwin's theory of the genetic relationship among species. Darwin, though not adopting the transcendental pattern of thought, yet devoted a long chapter to the "mutual affinities of organic beings" which dealt with all of the staple questions "philosophical anatomists" studied. Wyman was clearly impressed, whatever reservations he may have had about the mechanism of natural selection, reservations he shared with many other naturalists.

The fact that Agassiz and Owen, both steeped in the transcendental morphological tradition, came to resist Darwin's theory should not obscure the larger point that "philosophical anatomy" just as easily smoothed the way for the acceptance of evolution. There is good reason to suggest that Agassiz and Owen resisted Darwin for reasons of professional pride and jealousy, not philosophical differences. Gray reported that Wyman himself believed that Agassiz could have made an enduring place for himself if he had curbed his pride and brought his enormous knowledge of paleontology, embryology, and penetrating morphological insights to bear on the questions evolution raised.[9]

Wyman offered several contributions to Darwin to support his theory in his modest correspondence, which Darwin valued and acknowledged in the fourth edition of *The Origin*.[10] Already by 1861 Wyman was offering the evolutionary framework

[9]Gray reports this conversation with Wyman in his memoir on Jeffries Wyman which he delivered to the Boston Society of Natural History, October 7, 1874, *Proceedings of the Boston Society of Natural History* 17 (1874-75), 123-124.

[10]See the following correspondence between Darwin and Wyman: Wyman to Darwin, 15 Sept. 1860, *CCD* 8: 359-363; Darwin to Wyman, 3 Oct. 1860, *CCD* 8: 404-406; Darwin to Wyman, 3 Dec. 1860, *CCD* 8: 508-509; Wyman to Darwin, 8 Jan. 1861, *CCD* 9: 3-5; Darwin to Wyman, 3 Feb.

as a more plausible explanation than special creation in his courses on comparative anatomy and embryology. By 1863 he declared to Owen that

> I have long believed that the theory of 'progressive development' was a far more reasonable one than that of 'progressive creation': . . . . According to the theory of 'progressive creation,' every species must be presumed to spring *at once into perfected existence*, by the coming together of the atoms of earth & air. But in the natural world, in whatever direction we look, we see just the reverse of this, 'the order of Nature' being always the simple first & then the complex. Evolution by a progressive series of differentiations, is the direction to which Nature points her finger.[11]

His most explicit acceptance of the transmutation hypothesis came in his review of Owen's *Monograph on the Aye-Aye*. There he stated "that, as in the individual so in the aggregate of races, the simple forms were not only the precursors, but the progenitors of the complex ones, and that thus the order of nature, as commonly manifest in her works, was maintained."[12] Wyman was thus drawn to Darwin on the basis of his own meticulous anatomical investigations and philosophical commitment to the transcendental morphology of Richard Owen.

Wyman's religious beliefs do seem to have been gradually weakened by contemplating the implications of Darwin's theory. Gray characterized him as "philosophically a convinced theist, . . . a devout man, an habitual and reverent

1861, *CCD* 9: 18-20; the following letters are identified in *A Calendar of the Correspondence of Charles Darwin*, Wyman to Darwin, 22 Sept. 1865, Darwin to Wyman, 8 Oct. 1865, Wyman to Darwin, 11 Jan. 1866, Darwin to Wyman, 2 Feb. 1866. A. Hunter Dupree first called our attention to Wyman's relationship with Darwin in "Some Letters from Charles Darwin to Jeffries Wyman," *Isis* 42 (June 1951): 104-110.

[11]Wyman to Owen, June 1863, Owen Letters, 27:254, British Museum (Natural History), London; quoted in Appel, "Jeffries Wyman," 89.

[12]"Monograph on the Aye-Aye," *Amer. Jour. Sci.* 36 (Sept. 1863): 299.

attendant upon Christian worship and ministrations." However, Charles Eliot Norton, another close friend, objected that at the end of his life Wyman held the "the question of the existence of God as an open one." Wyman lamented to Norton that "This struggle for existence everywhere is an *awful* spectacle, -- not one perfect form on earth, every individual, from crystal up to man, imperfect, warped, stunted in the fight." Modern science seemed to him to have shaken the foundations of religious certainty. If this is a tolerably accurate remembrance, Wyman experienced the same crumbling of both scientific and religious orthodoxies that countless others did in Cambridge, some much sooner.[13]

Chauncey Wright

Wright finished reading *The Origin* by February 12, 1860 and immediately announced that he had "become a convert." Gray, perhaps, encouraged him to read it. The earlier developmental speculations of *Vestiges*, St. Hilaire, or even the nebular hypothesis, failed to persuade him. He was, however, convinced that Darwin had presented a solidly grounded account of the origin and structure of the present world. As far as he was concerned, "this development theory is a true account of nature, and no more atheistical than that approved theory of creation, which covers ignorance with a word [miracle] pretending knowledge and feigning reverence." Wright quipped that if the admission of miracles in creation was all that the pious needed, he was willing to "admit an infinite number of miracles, constituting continuous creation and the

[13]Gray, "Memoir of Jeffries Wyman," *Proc. BSNH* 17 (1874-1875), 124; Charles Eliot Norton to Gray, 1 Jan. 1875, Gray Herbarium Archives.

order of nature."[14] His close friend, Ephraim Gurney, recalled that they "read and re-read it aloud together, and talked over it and the reviews that appeared of it interminably."[15]

Wright graduated from Harvard in 1852 as a competent, though not distinguished, student of mathematics and physical science. He had, though, studied with three professors of world renown, the mathematician Benjamin Peirce, the anatomist Jeffries Wyman, and the botanist Asa Gray. He used his mathematical training after graduation to secure a position as a computer for the *Nautical Almanac*, a position he held for the remainder of his life. It was a position peculiarly well-suited to a budding philosopher. He discovered that he could complete all of his assigned work in three months, using some ingenious short-cuts he had devised. His colleague, Simon Newcomb, recalled that Wright

> had then an abominable habit of doing his whole year's work in three or four months, during which period he would work during the greater part of the night as well as of the day, eat little, and keep up his strength by smoking. The rest of the year he was a typical philosopher . . . [and] his disciples were his fellow computers on the almanac.[16]

Wright was introduced to the Scottish philosophical tradition through James Walker, his philosophy instructor at Harvard and president of Harvard. Walker brought out student editions of both Dugald Stewart's *Philosophy of the Active Moral*

[14]Chauncey Wright to Mrs. Lesley, 12 Feb. 1860, James Bradley Thayer, ed., *Letters of Chauncey Wright, with Some Account of His Life* (Cambridge: John Wilson and Son, 1878), 43; cf. 368.

[15]Thayer, *Letters of Chauncey Wright*, 367.

[16]Recollection of Simon Newcomb, Thayer, ed. *Letters of Chauncey Wright*, 70.

Powers in 1849 and Thomas Reid's *Essays on the Intellectual Powers of Man* in 1850 which contained William Hamilton's notes that Walker had edited.[17] These notes marked Wright's interest in Hamilton. He subsequently became an ardent disciple of Hamilton, devouring and defending everything that he wrote. Hamilton proved to be the perfect philosophical mentor for Wright. His notes alone provided Wright with a thorough knowledge of the history of philosophy which nourished his thought long after his devotion to him expired. Hamilton's effort to synthesize Common Sense Realism with Kantian idealism was also congenial with Wright's strong interests in both science and religion. In the mid-1850s Wright dipped into Francis Bacon, William Whewell's *Philosophy of the Inductive Sciences*, and Auguste Comte's *Philosophie Positive* which was then being translated into English.

Wright then discovered the British empirical tradition. He was deeply attracted to Alexander Bain's volumes on *The Senses and the Intellect* (1855) and *The Emotions and the Will* (1859) which provided a distinctly empirical basis for pychology; he maintained a lifelong interest in Bain's thought. Bain led him to John Stuart Mill's *A System of Logic* (1843) which he greatly admired. Mill's assault on the foundations of Hamilton's philosophy in *Examination of Sir William Hamilton's Philosophy* (1865) created a genuine crisis for Wright. He quickly abandoned Hamilton. Wright was thus deeply immersed in the conflicting currents of British and American philosophy and science when he read Darwin that winter.

[17]Walker's edition of Reid sold very well; it was already in its 9th ed. in 1859.

Wright was evidently paying careful attention to the Academy debates between Gray and Bowen during the spring of 1860. He had just been elected as a Fellow of the Academy in January. On May 8, a week after what must have been an electrifying meeting filled with Gray's rejoinder to Bowen and Bowen's counter rejoinder, Wright presented some brief "remarks on the architecture of bees, in reference to previous discussions [i.e. Bowen] upon the instinct of the honey-bee." Bowen had contended that the underlying cause of the mathematical precision of the hive-making instinct could only be explained by appeal to God. Wright offered a brief counter-explanation of how bee hives "might be the result of simple or sensible economy" and not require that the bees had some "supersensible properties of form" to guide them. Wright contended that the instinct of bees were no different than the instincts of other animals.[18]

Wright's naturalistic explanation of the construction of a bee hive stung Bowen into a stout rejoinder. He fired off a letter to Wright, his former student, upholding the Scottish distinction between physical and metaphysical causality: physical science dealt only with lifeless, passive objects (i.e. mathematics) whereas metaphysics dealt with living forms whose existence and manner of being could only be traced to God as the metaphysical cause.[19] This exchange merely confirms the presence of a yawning gulf of incomprehension between the Scottish philosophical and natural theological

[18]8 May 1860, Proceedings, 4 (1857-1860), 432-433. Wright elaborated on this theme in "the Economy and Symmetry of the Honey-Bees' Cells," *Mathematical Monthly* 2 (June 1860), 304-319.

[19]Bowen to Wright, 25 June 1860, cited by Phillip P. Wiener in "Chauncey Wright's Defense of Darwin and the Neutrality of Science," *Journal of the History of Ideas* 6 (1945), 22.

tradition and the newer streams of strong anti-metaphysical and strongly empirical philosophies that were emerging in England and France in the 1840s and 1850s.

Wright was one of the first on either side of the Atlantic to probe the profound philosophical implications of *The Origin*, especially in logic and psychology. He spent the remaining years of his life working them out in a stream of densely-packed articles and reviews and, most importantly, in animated provocative conversations in Cambridge with anyone who would listen. He wrote an early technical philosophical review of *The Origin* which Gray commended to Darwin in late 1860, in hopes that Thomas Huxley, new editor of *The Natural History Review,* would publish it. Huxley never did, presumably because it was not strongly anti-Darwinian enough for his polemical purposes and, in Darwin's words, was "too metaphysico-theological."[20] Wright eventually found congenial company for his musings on the philosophical insights to be gleaned from Darwin's ideas in the Metaphysical Club, a group of

[20]This is a fascinating episode in the relationship between Gray and Wright, a former student and, apparently a conversation partner. The documentary sources are frustratingly slim. There is good reason to suspect that Gray and Wright talked about Darwin, the Academy debates, Gray's review in the March *American Journal of Science*, and his summer and fall articles in the *Atlantic Monthly*. Gray sent a copy of Wright's *Mathematical Monthly* article on the bee cell to Darwin immediately after it was published; Darwin professed not to understand it at all. Wright must have written his review of *The Origin*, perhaps inspired by conversations with Gray, in late summer or early fall. Gray first commended the article to Darwin in his letter of 26 November 1860, at the same time that he was arranging the publication of his own pamphlet on *Natural Selection not Inconsistent with Natural Theology*. Darwin was not impressed with Wright's review. He no doubt passed the suggestion on to Huxley more out of loyalty to Gray than the promise the review showed for advancing his own cause. Huxley apparently was unimpressed as well. The following letters trace this history: Darwin to Gray, 3 July 1860, *CCD* 8: 275; Darwin to W. H. Miller, 1 Dec. 1860, *CCD* 8: 506-507; Darwin to Gray, 11 Dec. 1860, *CCD* 8: 522; Darwin to Huxley, 11 Dec. 1860, *CCD*: 8:523; Huxley to Darwin, (before) 14 Dec. 1860, *CCD* 8: 527; Darwin to Gray, 14 Dec. 1860, *CCD* 8: 528; Darwin to Hooker, 29 Dec. 1860, *CCD* 8: 541; Darwin to Gray, 17 Feb. 1861, *CCD* 9: 29-31; Darwin to Huxley, 22 Feb. 1861, *CCD* 9: 34; Darwin to Gray, 26 Feb. 1861, *CCD* 9: 39-40; Darwin to Gray, 12 Mar. 1861, *CCD* 9: 51-52; Darwin to Gray, 11 Apr. 1861, *CCD* 9: 88-89; Darwin to Huxley, 22 May 1861, *CCD* 9: 134-135.

young men who laid the foundation for Pragmatism. One of the other prominent members of this group was Charles Sanders Peirce, who responded to Darwin in a unique way.

Charles Sanders Peirce

The storm over Darwin broke while Peirce was in Louisiana surveying with the United States Coast and Geodetic Survey. He returned in the summer of 1860 to find Chauncey Wright "all enthusiasm for Darwin," believing that Darwin provided a perfect illustration of Mill's empiricism. Peirce was quick to splash cold water on his older friend. Peirce declared that, far from being in harmony with each other, Darwin's "positive observations" would surely kill John Stuart Mill's "metaphysical" doctrines in the long run.[21] Peirce always rejected the scientific validity of Darwin's theory and the sufficiency of natural selection to explain evolution. At the same time he was persuaded that *The Origin* harbored deeper significance, which it was his life's task to tease out. Peirce spent the rest of his life brooding over the deeper meaning of evolution for all of the philosophical issues he cared about, from the logic of scientific method to the place of love in the universe.

Peirce was the scion of Boston Unitarian gentility, the son of America's leading mathematician and prominent astronomer, Benjamin, a professor at Harvard. The Peirce home was a prominent intellectual and cultural center; it regularly hosted

[21]C. S. Peirce, *Collected Papers*, ed. Charles Hartshorne and Paul Weiss (Cambridge: Harvard University Press, 1960-1966), 5.64.

the leading men of science and literature, including such noteworthies as Henry James and Ralph Waldo Emerson. Young Charles grew up with the most refined intellectual tastes of the Boston gentility. However, he did not experience the simple harmony of these diverse influences as his father's generation did. The tensions he experienced between the religious and scientific influences in his youth indelibly stamped his life and philosophical perspective. Charles never inherited the ease and exuberance with which his father reveled in the harmony of science and religion in his lectures.

While a student at Harvard, Peirce abandoned the rigid curriculum for his own independent study of contemporary philosophy. Peirce cut his philosophical teeth on Kant's *Critique of Pure Reason.* He studied it for hours on end, committing virtually all of it to memory. Hamilton and Comte figured prominently in his study as well, along with a large dose of the romanticism that flowed out of post-Kantian Germany. His student notes for his junior and senior years are filled with titles of notes taken and essays projected on a wide gamut of philosophical themes. The tensions he was experiencing in his thought is poignantly and prophetically reflected in his "List of Horrid Things I Am: Realist, Materialist, Transcendentalist, Idealist."[22] It was to science, particularly its logical method, that he soon turned to resolve the tension and reconstruct the harmony of science and religion he yearned for. His particular version of pragmatism was an essential component of this quest.

Simon Newcomb

[22]Draft of "Treatise on Metaphysics," [ca. 1859], Peirce Papers; cited in Croce, *William James*, 182.

Simon Newcomb confronted Darwin through a more concentrated interest in mathematics and astronomy than did either Wright or Peirce.[23] He had only recently moved to Cambridge in late 1856 to assume a position as a computer at the Nautical Almanac on the recommendation of Joseph Henry, America's premier physicist, whom he had met and impressed at the Smithsonian Institution with his mathematical abilities. The Almanac office proved to be as congenial for Newcomb as it was for Wright; the two became fast friends. They did not allow their astronomical calculations to interfere too much with their "real" work, which was, of course, the intense discussion of pressing philosophical issues revolving around science and its methods. Newcomb recalled that "philosophic questions were our daily subjects of discussion," particularly Newcomb's favorite topic of free will versus fatalism. While working at the Almanac office Newcomb became a student of Benjamin Peirce at the Lawrence Scientific School. Recognizing his native talent, Peirce gave Newcomb a free reign in preparing for his final examination. He passed summa cum laude.[24]

During these years Newcomb found time to broaden his study beyond mathematics, to include an especially keen interest in religious topics and their connection with science. His mother was a devout Baptist; his father a man of no decided religious views. He was raised, he said, in "the old Calvinistic orthodoxy in its gloomiest form," which stressed human depravity, and, most importantly, the need

[23]My profile of Newcomb draws on the masterly recent biography by Albert E. Moyer, *A Scientist's Voice in American Culture: Simon Newcomb and the Rhetoric of Scientific Method* (Berkeley: University of California Press, 1992).

[24]Moyer, *A Scientist's Voice*, 20-31, *passim*.

to be "born again" to avoid being damned to hell. Though he tried mightily to experience a conversions, he failed. He thereafter moved from "active belief" to "indifference." Living in the more liberal atmosphere of Cambridge rekindled his religious interests. He soon became a regular auditor of a range of different churches, including Episcopal, Methodist, Unitarian, and Swedenborgian. Religious conversation was frequent with Andrew Peabody, the new Harvard chaplain, and his housemates in Harvard Divinity Hall where he roomed. His carefully kept "Alphabetical Catalogue of Books" listed both Butler's *Analogy of Religion* and William Paley's *Natural Theology*. This renewed interest in religion never took deep root in Newcomb, try as he might. The pull of his mother's devout and simple Christian faith failed to conquer the more secular rationalism of his father. In the end, he admitted that his reluctance to become a believer of any kind could not be overcome. This tension between the desire to believe and his intellectual arguments against belief marked Newcomb's life and philosophical attitudes toward science and religion.[25]

Newcomb filled out his philosophical education in the years before *The Origin*, moving in the process from the tenets of the orthodox Scottish philosophy to the more revolutionary teachings of Comte, Mill, and Darwin. He records having read George Boole's *Laws of Thought*, Richard Whately's *Logic*, Francis Bowen's *Political Economy*, and Walker's popular edition of Thomas Reid's *Intellectual Powers of Man.*

[25]Moyer, *A Scientist's Voice*, 20-21, 32-34.

These books, along, with sharp critical discussions of them with Wright, Peirce, and others, introduced Newcomb to the fundamental philosophical and scientific ideas he would spend the remainder of his life refuting and reconstructing.

Newcomb, as did his friend Chauncey Wright, was most dissatisfied with the way that the Scottish philosophy entangled science with metaphysics. He found in Comte's clean positivism and Mill's stringent empiricism the materials for freeing science from being suffocated by final causes, God, and all other non-empirical abstractions. He maintained an appreciative, though critical, attitude toward Comte. It was Mill that he absorbed most thoroughly. His diary records that he purchased a copy of Mill in January 1860, in the early stages of the debate over Darwin. He subsequently purchased a set of Whewell's *History of the Inductive Sciences*. He thus had in his possession articulate spokesmen of the two competing positions in the philosophy of science, Whewell, representing the Scottish position leavened with Kant, and Mill, representing the claims of a pure inductivism.[26]

Mill was provoked to battle what he considered to be the pernicious influence of the Scots' metaphysics in science. He was clearly aiming at Herschel and Whewell, the two giants of Scottish philosophy of science in mid-nineteenth-century England.[27] Mill went straight for the nerve center of the Scots' philosophy: their

[26]Moyer, *A Scientist's Voice*, 42.

[27]My purpose in raising the Whewell-Mill debate is sufficiently served by treating its effect on Newcomb. The philosophical contours of this debate are most recently explored by Gerd Buchdahl in "Deductivist Versus Inductivist Approaches in the Philosophy of Science as Illustrated by Some Controversies Between Whewell and Mill," in Menachem Fisch and Simon Schaffer, eds. (Oxford: Clarendon Press, 1991), 311-344.

"common sense" belief that knowledge of the external world could be grounded in intuition and consciousness, completely independent of experience and observation. This frail belief, he charged, violated all the principles of logic and scientific method and vitiated sound inquiry. All knowledge, even the much-vaunted knowledge of mathematics and physics, was derived from sensory experience; all knowledge that was worthy of the name was gained inductively through patient attention to experience. Whatever could be said about the deliverances of intuition, to say nothing of any alleged revelation, could not be called "knowledge" or confused in any way with "science." Science meant only that knowledge about the external world that was gained through patient attention to the facts of experience. Mill had cut through the knot that had bound Baconian empiricism to all forms of natural theology and metaphysical speculation. Mill's *System of Logic* became the rudder of Newcomb's subsequent statements on the philosophy of science.[28]

Newcomb had no substantial background or interest in biology and allied subjects, but he was nonetheless present at the Academy in the spring of 1859 for the debates between Gray and Agassiz and in the spring of 1860 between Gray and Bowen. Benjamin Peirce, Newcomb's mathematics mentor and advisor to the *Nautical Almanac*, arranged for his two young proteges, Newcomb and Wright, to attend the special meetings in 1859. Newcomb was apparently more interested in debating Bowen on free will after the meetings than he was in the substance of the

[28]cf. Moyer, *A Scientist's Voice*, 41-45.

debates. He was elected a Fellow of the Academy along with Chauncey Wright in January 1860. Even that did not seem to pique his interest in the intense debates between Gray and Bowen. Following the last date of the debate, 1 May, he noted that he "attended a special meeting of the Academy called for the purpose of finishing up the Darwinism discussion, which I hope is done."[29]

Newcomb's indifference toward the Academy debates over Darwin is telling. He professed that he became acquainted with Darwin, Herbert Spencer, Thomas Huxley, William Clifford, John Tyndall, and Ernst Haeckel primarily through criticisms of their views which he read in the religious press and only occasionally through their shorter essays. While he did not share their disdain for Christianity, he admired and approved their method.[30] That was the key for Newcomb. Whatever the particular merits of their arguments, Newcomb was committed to their method. Comte, Mill, and even Darwin successfully freed Newcomb's science from the encumbrances of natural theology and metaphysics. He presented two short communications to the Academy after the Gray-Bowen debates ended that perfectly illustrate this tendency. The first applied probability theory to the calculation of the orbits of asteroids and the second gave a spirited defense of Simon LaPlace's doctrine of probabilities against the charges of John Stuart Mill and others. The substance of *The Origin* was, for the time being, irrelevant to Newcomb; he had already been

[29]Moyer, *A Scientist's Voice*, 39.

[30]Moyer, *A Scientist's Voice*, 39-40.

converted to the spirit of Darwin's positivist philosophy of science.[31]

John Fiske

When *The Origin* reached Cambridge in early December 1859, John Fiske was already in the throes of a deep spiritual crisis. A close examination of this formative period in his life gives us an unusually vivid insight into the nature of the intellectual revolution that was already underway for many in New England when *The Origin* was published.[32] Fiske was raised in a conventional Congregational church in Middletown, Connecticut; he gave every early appearance of earnestly seeking to make its orthodox beliefs his own. He was a brilliant teenager whose omnivorous reading habits brought him into contact with the major British and European intellects of the 1850s.[33] These

[31]*Proceedings of the American Academy of Arts and Sciences* 4 (1857-1860), 24 April 1860, 417-418, 8 May 1860, 433-440.

[32]The following portrait of John Fiske is based on John Spencer Clark, ed., *The Life and Letters of John Fiske* (Boston: Houghton Mifflin, 1917), 2 vols.

[33]In addition to his already considerable accomplishments in languages (Latin, Greek, French, Spanish, German), mathematics (spherical geometry, trigonometry, and conic sections), and the classics, Fiske had devoured by early 1860 the following impressive and illuminating list of the latest books in science: Agassiz, *Principles of Zoology* and *Essay on Classification*, Johnston, *Natural History*, Turner, *Chemistry*, Lambert, *Practical Anatomy and Physiology*, Lardner, *Astronomy and Physics*, Chambers, *Elements of Zoology*, Milne-Edwards, *Elemens de Zoology*, Cuvier, *Le Regne Animal*, Redfield, *Zoology*, Herschel, *Outlines of Astronomy*, LaPlace, *Systeme du Monde*, Dalton, *Human Physiology*, Peaslee, *Human Histology*, Wilson, *Human Anatomy*, Dunglison, *Human Physiology*, Gray, *Structural and Systematic Botany*, *Vestiges of the Natural History of Creation*, Viery, *Philosophie de l'Histoirie Naturelle*, Ampere, *Sur la Philosophie des Sciences*, Thompson, *Inorganic Chemistry*, Williams, *Principles of Medicine*.

He added the following books in philosophy: Coleridge, *Religious Musings*, Upham, *Mental Philosophy*, Ferrier, *Institutes of Metaphysic*, Schlegel, *Philosophy of History*, Fichte, *The Destination of Man*, Hume, *History of England*, Lewes, *History of Philosophy*, Strauss, *Life of Jesus*, Paine, *Age of Reason*, Muller, *Survey of Languages*, Comte, *Positive Philosophy*, Whateley, *Elements of Logic*, Mill, *System of Logic*, Rousseau, *Confessions*, Mansel, *Limits of Religious Thought*, Mackay, *Progress of the Intellect*.

He read the following books in natural theology and apologetics as well: Hugh Miller, *The*

men, each in their own way, raised deep questions in his mind about the truths of the "evidences" on which orthodoxy had rested its case. Ironically, Horace Bushnell's *Nature and Supernature*, hailed by many progressive Christians at the time as a consummate defense of Christian truths, "with its total ignorance of physical science did more to shake my faith than anything else." It was the first volume of Henry Buckle's *History of Civilization* that sealed Fiske's rejection of Christian orthodoxy and embrace of the new science. He, like so many other intellectuals at the time, was smitten with Buckle's effort to reduce the contingencies of history to law, elevate the progress of science over decadent metaphysics, and emphasize natural rather than divine forces in shaping the development of civilization.[34] After carefully weighing the religious views he had accepted without questioning against the views held by a host of scientists and philosophers, Fiske found that Christianity was

> inextricably immeshed in a mass of metaphysical assumptions, wherein science was disowned, where reason was discredited, and where blind, unquestioning

Testimony of the Rocks, James Walker, *God Revealed in the Creation and in Christ*, James Walker, *Philosophy of the Plan of Salvation*, Francis Wayland, *Intellectual Philosophy*, Isaac Taylor, *The World of Mind*, Jonathan Edwards, *On the Will*, Laurens Hickok, *Rational Psychology*, Nelson, *Cause and Cure of Infidelity*, Mark Hopkins, *Evidences of Christianity*, and Archibald Alexander, *Evidences of the Authenticity, Inspiration, and Canonical Authority of the Holy Scriptures*. Spencer, *LLJF*, 1: 106-107, 112, 125-126.

Fiske's meticulous record of his reading enables us to chart with unusual clarity the contours of the intellectually unsettled landscape of England and America in the 1850s.

[34]Spencer, *LLJF*, 1: 113-114. Fiske wrote an impressive essay review of Buckle which was published in the *National Quarterly Review* for December 1861 while only a junior; it is republished, along with criticisms he later offered, in John Fiske, *Darwinism and Other Essays* (Boston: Houghton Mifflin, 1879), 143-206. Ephraim Gurney, a Latin tutor at Harvard (a classmate and friend of Chauncey Wright and future Dean) took a special interest in Fiske. He declared that Fiske's review of Buckle "was the ablest, most just, and philosophical review of Buckle that had been written." E. L. Youmans sent Herbert Spencer a copy of the article, thus laying the groundwork for a warm friendship between Fiske and Spencer. Spencer, *LLJF*, 1: 215, 217. In sharp contrast Francis Bowen wrote a scathing review of Buckle for the *North American Review* 93 (October 1861): 519-559.

> faith was regarded as the only passport to true Christian knowledge. Fortunately science was giving a nobler and a more verifiable knowledge in regard to cosmic creation and the meaning of human life, as well as yielding a far higher conception of the Infinite Power back of the cosmos than could be derived from these dogmas, and I was not long in freeing my mind from their benumbing influence.[35]

Though he abandoned an orthodox Christian faith, Fiske never abandoned his religious feelings. He believed that Christianity had "enshrouded". . . "great spiritual truth" in its dogmas which, while serving civilization in its infancy, must now be discarded in light of the maturity of civilization that the progress of science had revealed. In the expansive vistas of the 'new' science that Humboldt's *Cosmos* first opened up to him, Fiske discovered "a revelation of its Divine Creator, written in hieroglyphics--the sacred language which science is daily translating into the dialects of mankind."[36] He could now soar above and beyond the narrow, constrictive, and irrational orthodoxy of his youth to embrace a new, more positive faith. Despite the agony his conversion to Positivism caused his mother and the ostracism he experienced for his infidelity in Middletown, Fiske never wavered from his decision.

Fiske, having outgrown his prep school and private tutor and already admitted to Yale, was determined to enter the more liberal and advanced Harvard with junior standing. Just a few months before he left for Cambridge, he found time to read

[35]Spencer, *LLJF*, 1:103.

[36]Spencer, *LLJF*, 1: 123-125. Perhaps young John was enraptured by Humboldt in the same way that young Charles Darwin was while a student at Cambridge. Darwin tells us that it was Humboldt's *Personal Narrative* which was one of the two books which "stirred up in me a burning zeal to add even the most humble contribution to the noble structure of Natural Science," *Autobiography*, 68. He does not tell us if he read all seven volumes and 3754 pages of Humboldt's narrative of his travels through South America.

Agassiz's *Essay on Classification*, Gray's text on *Structural and Systematic Botany*, and Darwin's *The Origin of Species*.[37] He arrived in Cambridge in May 1860 to prepare for the rigorous admissions exam to be held in August.[38] Having secured a tutor and established his methodical study schedule, he found ample time to satisfy his passion for the new learning. He quickly discovered that Little, Brown & Company's bookstore carried all of the latest English Positivists, which he enthusiastically read. They also carried the work of the Germans, Humboldt and Ehrenberg, as well as the Frenchmen, Comte, Robin, Littre, Berard, Pouchet, and Verdeil. He declared to his mother that "no previous instance in the history of thought can be found of so many great thinkers uniting under the same standard." Fiske was proud to count himself among their number.[39]

As glorious as was this discovery, Fiske's real philosophical epiphany came in June when he discovered Herbert Spencer. He found Spencer's prospectus in the

[37]Spencer, *LLJF*, 1: 186.

[38]Fiske easily passed the exam and was admitted as a sophomore in October 1860. He was appalled at the lack of attention to the sciences in both the exam and the Harvard curriculum.

[39]It was common at the time to use the term "positivist" to denote a common spirit that united a broad range of thinkers who challenged established philosophical and religious beliefs on the basis of "positive" scientific discoveries. Thus, Auguste Comte was only one of a great number considered to be "Positivists." This is the way that Fiske used the term here. Charles Cashdollar provides an in-depth analysis of "positivism" in America in *The Transformation of Theology, 1830-1890: Positivism and Protestant Thought in Britain and America* (Princeton: Princeton University Press, 1989).

Fiske ran afoul of the strict rules governing proper chapel attendance and demeanor at the beginning of his junior year when he was caught reading Comte in the Harvard chapel. Francis Bowen and President Felton urged that he be suspended for a year for spreading infidelity among the students and showing disrespect for Christianity. Cooler heads and Fiske's many faculty supporters prevailed; he was let off with a "public admonition" and a letter to his mother urging her to reign in her son's "mischievous opinions." Clearly, Fiske was not the only one harboring these "infidelities" at Harvard. Ironically, just eight years later, Charles Eliot, the new president, would invite Fiske to lecture on these same "scandalous" views.

bookstore of Ticknor & Fields that announced plans for the publication of his entire system of philosophy through subscription. He exulted to his friend George Roberts: "Oh, George, my soul is on fire! . . . for Herbert Spencer is about to execute a gigantic series of Positive books on which he has been at work for years. . . . My name goes down tomorrow--subscription only $2.50 per year." All the great men have already put down their names. He assured his mother that it was his "duty to mankind as a Positivist to subscribe" to what would surely be "a perfect library of Positivism." He wished he could give $1,000,000 for "this great work." Fiske would go on to become a friend of Spencer and the major American interpreter of the religious implications of Spencer's Evolutionism.[40]

The profiles of these five prominent Cambridge residents reveal a number of significant themes that deepen our understanding of the intellectual milieu of Harvard during the early months of the debate over Darwin. It is clear, that there was a broad intellectual divide between the natural scientists (Agassiz, Rogers, Gray, Wyman), on the one hand, and the physical scientists and philosophers (Bowen, Wright, Peirce, Newcomb, Fiske), on the other. It seems generally to be the case that the naturalists were the least aware of the new philosophical controversies and their bearing on their

[40]Fiske to Roberts, 24 June 1860, Fiske to his mother, 24 June, 1860; Spencer, *LLJF*, 1:139. Fiske's philosophical vision is most clearly articulated in *Outlines of Cosmic Philosophy* (Boston: Houghton Mifflin, 1874), 2 vols. These volumes greatly expand material that was first delivered as lectures at Harvard in fall 1869 and spring 1871 and then, in various forms, in Boston, New York, Milwaukee, and London. Spencer, interestingly, did not endorse his disciple's religious interpretation of his doctrines. He could certainly have sympathized with the surprising, and often embarrassing, ways Darwin's work was interpreted by his admirers.

own specialties and Darwin's theory. Those, like Rogers, Gray, and Wyman, who did sympathize with Darwin did so on the basis of their own independent and painstaking empirical work in geology, botany, and anatomy, not because any new philosophical currents swayed them.[41] Wyman, in fact, supported Darwin on the basis of a philosophical position that Positivism was challenging. Gray was the only one who showed some interest in philosophical matters, but even he lacked in-depth understanding of the issues at stake. The natural scientists lagged considerably far behind the physical scientists in articulating a philosophical basis and framework for their inquiries. Their response to Darwin, thus, came from out of older philosophical frameworks, Scottish and transcendental, and their own narrowly-focused field and laboratory work.

It was the physical scientists and philosophers who were most in tune with the advanced work in science and philosophy that was unsettling English intellectual life in the 1850s. The latest books and ideas in Positive philosophy and science from England were readily available and, on the basis of our small sample, broadly read

[41]We could also add Charles Eliot to this group of naturalists. When the storm over *The Origin* broke, Eliot was a young chemistry professor of twenty-five at the Lawrence Scientific School. Eliot took no active part in the debates over Darwin. Not only was he the junior member of the faculty, but he had never (and never would) shown any interest in the philosophical and theoretical aspects of science and chemistry. He was motivated primarily by the practical benefits to be derived from studying and teaching chemistry and providing the essential institutional scaffolding necessary to spread those benefits to society. The Lawrence Scientific School was thus the ideal educational setting for him. There he, and other dedicated scientists, could pursue their science freed from the curricular burden of the classical curriculum of the college and, by strong implication, from the onerous burden of showing the harmony of their science with society's religious beliefs. When Eliot became president in 1869 began a major campaign to transform Harvard into his image of the Lawrence Scientific School. He was eminently successful.

and discussed. Intellectually astute Americans may not have contributed to the philosophical leavening of the 1850s, but they were surely abreast of the latest debates and understood their import for the reigning theological, philosophical, and scientific orthodoxies in America. It was not Darwin who initiated these debates and gropings for alternative philosophical frameworks for these men. They were already familiar with the advanced thinking of Comte, Mill, Buckle, Lewes, Hamilton, Mansel, and Powell. These Positivists were the lenses through which Wright, Peirce, Newcomb, and Fiske read and interpreted Darwin. The result was that they read Darwin in ways that were strikingly different from the way naturalists did, even those, like Gray and Rogers who sympathized with Darwin. They also advanced a very different rationale and agenda than did the naturalists in rising to Darwin's support and appropriating his insights.

Though Wright, Peirce, Newcomb, and Fiske were united in accepting the broad outlines of the Positivist perspective in challenging philosophical, religious, and scientific orthodoxies, they were by no means united in their particular alternative approaches. Only Wright showed any interest in *The Origin* as a sustained biological argument. Newcomb remained skeptical of natural selection and Darwinian evolution the rest of his life. The others were far more intrigued by what they could learn from Darwin to answer the philosophical questions they were already considering. Wright and Newcomb despised Spencer; Fiske idolized him. All four were deeply critical of prevailing religious orthodoxies, whether Christian or Unitarian, but nevertheless wanted to retain some place for "religion" in their philosophies, even Wright. Since

all of them now interpreted "religion" in the post-Kantian mode of subjective feelings devoid of content and immune from challenges from the "positive" sciences, they differed quite significantly on the precise shape of this "religion." They thus had a profoundly different understanding of the bearing of *The Origin* on "religion" than did the naturalists, particularly Asa Gray.[42] The important differences between the way these philosophical radicals read Darwin and the way that Gray read him were played out most vividly in the relationship between Chauncey Wright and Asa Gray, which we will discuss more fully in chapter 9.

[42]Their disagreements took more definite shape when Peirce and Wright convened their informal "Metaphysical Club" in the late 1860s to discuss the bearing of Darwin on the broader meaning of evolution and the philosophy of science. The different "pragmatisms" that emerged from this group have their roots in the members' very different responses to the Positivist controversies of the 1850s.