

Splash or Ripple: The Effect of Darwinian Thought in Latter 19th and Early 20th Century North America

Jon Khan 
York University
Toronto, Ontario, Canada

Citation:

Jon Khan: Splash or Ripple: The Effect of Darwinian Thought in Latter 19th and Early 20th Century North America .
Lethbridge Undergraduate Research Journal. 2008. Volume 3 Number 2.

Abstract

The paper is an overview of the historiography surrounding the impact of Darwinian thought in latter 19th and early 20th century North America. There definitely seems to be an intellectual trend to ignore the economic, social, religious, academic, and ideological contexts of the late 19th and early 20th centuries. In turn, some intellectuals posit Darwin as the maker of some dynamic pedagogical splash. My paper takes an alternative position on the subject and argues that while theoretical Darwinian thought may have been innovative, it was only one of many ancillary factors that in some contexts (1860-1910) had a minor influence and in others (1910-1935) had little to none. I argue that views that state otherwise completely misappropriate Darwinian Theory. I reach this claim by examining the effect of Darwinism on social thought in North America in the late 19th and early 20th centuries by tracing the links between Darwinian thought and theories that developed later. In addition, this paper examines the ways in which both social thinkers of the era under investigations and later, historical scholars, constructed (or misconstrued those influences). My methodology would be revisionist in that I call for a reconsideration of the proposed effects of Darwinian Theory. This paper advances the material based on Darwinian history in that it rejects the received view of history and calls for the stated reconsideration(s).

In 1909, philosopher and psychologist John Dewey argued that “the greatest dissolvent in contemporary thought of old questions, the greatest precipitants of new methods, new intentions, new problems is the one effected by the scientific revolution that founds its climax in [Charles Darwin’s] *Origin of Species*.”¹ In 1998, biology professor and interim vice president of Akron University Randy Moore similarly argued that the *Origin of Species* “is the most controversial and arguably the most importance scientific book ever written. [It replaced the Victorian view of nature] as a benevolent, nearly perfect, and harmonious world (in which beauty was given a purpose) with a violent and amoral world lacking a divine purpose.”² Both quotes contextualize a view that Darwinism played one of the most important pedagogical roles in the scientific, academic, and social realms of the era.³ Unfortunately, notwithstanding the notoriety and historical proximity of the former and academic achievements of the latter, both claimants demonstrate an apparent lack of knowledge regarding both nineteenth and early twentieth century North American *zeitgeist*. In contradistinction, the historiography vis-à-vis the economic, social, religious, academic, and ideological contexts of the late nineteenth and early twentieth centuries demonstrates that while theoretical Darwinian thought may have been innovative, it was only one of many ancillary factors that in some contexts (i.e., 1860-1910) had a minor influence and in others (i.e., 1910-1935) had little to none. Views that state otherwise completely misappropriate Darwinian theory. The veracious historicist claim is that Darwinian theories were just another ripple, as opposed to a dynamic pedagogical splash as proposed by Dewey and Moore, in an already dynamic era of change.

Edward Purcell argues, “in America Darwin had served as the great intellectual catalyst in producing the social sciences, which by the beginning of the twentieth century were embarking on a period of astonishing growth.”⁴ Carl Degler also shares such an opinion and argues that Darwin set the framework for social science.⁵ Both statements are indicative of a lack of holistic understanding of both Darwinian and social science *sitz im leben*. Alan Trachtenberg presents a picture of social upheaval in America in the period of 1860-1900. In only three decades following the civil war, many mainly agrarian and mercantile towns and small cities had conceded to industrialization.⁶ Bloody and destructive industrial strikes

were common, leaving hundreds dead and millions of dollars worth of property damaged.⁷ One out of every three industrial workers was an immigrant and immigrants represented one-third of the population increase from 1860-1890.⁸ Machines were viewed as “autonomous and omnipotent, brooking no resistance against its untold and ineluctable powers [and were becoming] an article of faith. This image implied a popular social theory: the machines as a human benefactor, a great emancipator of man from the bondage of labour.”⁹ Yet, despite the declaration that industrialization would birth better morals, sanitary conditions, health, and wages, about 45% of industrial workers were barely above the poverty line barely were held above the poverty line; and, another 40% lived in intolerable conditions, consisting of shabby tenement housing and in run down neighbourhoods “by dint of income eked out by working wives and children.”¹⁰ Journalist J. Dacus wrote in 1877 that America was on the edge of a civil disaster: “crisis came upon the country. It seemed as if the whole social and political structure was on the very brink of ruin [- thousands of the working class alleged that they were wronged and oppressed.]”¹¹ As a result, there was a drastic need for social assistance and the employment of social programs arising not from some framework set forth by Darwin's methodology, but from an actual social need. Marlene Shore argues that “sociology as a discipline arose out of theology and social work as a distinct subject in 1880.”¹² Robert Richards argues, “it is historical objection that Darwin unwittingly infused his theory with the political assumptions of *laissez-faire* English liberalism and the hedonistic selfishness of Bethamite utilitarianism.”¹³ Perhaps Degler and Purcell are both unaware of such overt influences upon Darwinian thought. Social work is definitely not a part of the liberal ethos of *laissez-faire* economics, but rather is an antithesis to the free hand of politics. Thus, to argue that the social sciences were birthed out a Darwinian framework with its latency of *laissez-faire* and Bethamite utilitarianism is a complete falsehood that ignores the social context of the late 1800's and inaccurately posits Darwin as more influential than he was.

A more nuanced claim would be one arguing that Darwin's theories were an example of scientific objectivity. However, the pertinent question is whose objectivity; and, if Darwin was an example of such objectivity, then the standard could not have been his to set, but rather only to follow. According to Peter Novick: “science was never more highly regarded in the United States, was never more of a cult, than in the late nineteenth and early twentieth centuries.”¹⁴ Francis Bacon's methodology was the epitome (even though it was established some hundreds of years earlier) of this scientific method in the nineteenth and well into the twentieth century. Baconism meant two things: first, a rigidly empirical approach (observations were sacred); and second, the avoidance of mere hypotheses (it was unscientific to go beyond what could directly be observed or to anticipate nature.)¹⁵ Moore argues Charles Darwin “knew that if his ideas were to be accepted he had to address...Baconian science...the paradigm of Darwin's day.”¹⁶ Novick also affirms this statement, arguing that while Darwin believed that Baconian induction was fiction, he dissimulated to the method in order to win acceptance, even going so far as to argue that he “worked on true Baconian principles, and without any theory [hypothesis] collected facts on a wholesale scale.”¹⁷ To argue that the social science method was patterned after the empiricist research model of Charles Darwin is false. Such claims are misinformed; Darwin was merely following the sixteenth century model established by Bacon. Darwin was not a shaper of the period, but rather the period was a shaper of Darwin. It is more accurate to argue that the father of empiricist social science methods was not Charles Darwin, but Francis Bacon.¹⁸ Such a claim accurately repositions Darwin as just another subordinate follower of the scientific model, rather than a dynamic leader.

William Dawson, principal of McGill University, feared that that Darwinism would erode the fundamental unity and harmony of truth - be it spiritual or natural - and thus would yield social chaos. Darwinism, he argued in 1873, “reduces the position of man, who becomes a descendant of inferior animals, and a mere term in a series whose end is unknown. It removes from the study of nature the ideas of final cause and purpose.”¹⁹ While I presume that Dawson judiciously studied the claims of Darwin before making such a claim, it is unclear if Dawson truly understood the claims of Darwin before making such a statement. Moore argues, “Darwin believed that nature was god's grammar - that is that nature was an inherently expressive system of natural signs that represent the true relations of things.”²⁰ In Darwin's second edition of *Origin*, he encouraged readers to interpret his ideas in the context of conventional natural theology. Furthermore, In Darwin's third edition he advertises a separately published paper by Professor Asa Gray, Professor of Natural History at Harvard, which was titled “Natural Selection Not inconsistent with Natural Theology. A free examination of Darwin's Treatise on the Origin of Species and of its American Reviewers.” Darwin, also in this 1872 third edition, even changed the last sentence of the book from “with its several powers having been originally breathed into a few forms into one” to “with its several powers having been originally breathed *by the creator* into a few forms or into one.”²¹ This begs us to ask, if Darwin, as an agnostic, was so explicitly trying to erode spiritualism or God from society when he wrote *On the Origin of Species*, why did he repeatedly use theistic language in his arguments?²²

Richards argues that the received view of history that is so often associated (for example the likes of William Dawson) misappropriates Darwin in a fallacious manner:

the received Darwinian revolution eviscerated nature of moral purpose and ethically neutered the human animal. Selfishness bred by competitive selection, so the tale goes, has seeped into the very marrow of man's being, rendering all ethical behaviour a pretext for individual advantage...[however] a closer and more philosophical analysis demonstrate[s] that Darwin, Spencer, and their disciplines had very different conception of the implications of evolutionary theory from man. They believed that their evolutionary constructions reanimated moral life, that the evolutionary process gave heart to unselfish, altruistic behaviour.²³

Thus, it seems implausible to argue (as Dawson did) that Darwinism was some type of moral expressivism that would yield social chaos. Jackson Lears argues that the process of secularization exacerbated the problem of personal moral responsibility, and contributed to a sense of unreality. Furthermore, “during the late nineteenth century, for educated Americans, secularization meant primarily a dis-ease: a sense that American Christianity had begun to lose moral intensity and that as a result, the entire culture had begun to enter what Nietzsche had called a weightless period.”²⁴ However, to say that Dawson's claims were prophetic and that history validates his fears of 1873 ignores the instability of the period – industrialization, urbanization, poor working conditions, shifting of government authority to corporate authority, etc – that climaxed in the 1880's. In fact, Lears argues, “the fragmentation of selfhood was *rooted* in the process of *urbanization*, but also shaped by the social relations of a *maturing capitalist society*. In an interdependent urban market, the fragmented self became a commodity like any other, to be assembled and manipulated like any other.”²⁵ Thus, Dawson's statement was not valid, and should not be accepted or associated with an accurate representation of nineteenth and twentieth century

historicism. The failing society and social unrest was due to a plethora of other greater factors (such as discussed by Trachtenberg and Lears) that existed regardless of Darwinism. To propose that Darwinism was a secondary or tertiary influence upon social unrest is largely implausible.

Shore argues that University of Chicago philosophers in the early twentieth century derived their ideas regarding evolutionary and organic change from Charles Darwin, and regarded themselves as his intellectual heirs.²⁶ Shore notes that Dewey argued in 1910 that the publication of the *Origin of Species* marked an epoch in the development of natural sciences: "It embodied an intellectual revolt. Dewey argued, by introducing the phenomenon of transition to life."²⁷ Dewey contended that species were regarded as fixed and in final form until Darwin undercut that argument in 1859. Darwin, he argued, allowed the fixity of logic as it applied to both human life and philosophy to be questioned.²⁸ However, such a claim ignores the historical reality that occurred in 1826, some thirty-years before Darwin released his claims, with the discovery of non-Euclidean geometry. Eric Temple Bell argued, in his 1934 work, *The Search for Truth*, that the discovery of Euclidean geometry was the third of four great landmarks in the intellectual human history (interestingly enough, Darwinism was not noted as a landmark).²⁹ By the beginning of the nineteenth century, mathematicians had begun to understand that the postulates of Euclid (which had firmly stood for 2100 years) could be called into question; and, that more than one system of geometry was possible. Moreover, if Euclidean propositions could be and were being questioned, the logic of Aristotle could also be called into question. Some might argue, like Dewey, that Darwin called the logic of Aristotle into question with his theorizations regarding natural selection. However, as argued, Darwin did not erode the sense of Aristotelian form since natural laws, according to Darwin, were still in place; and moreover, there still, under Darwinism, existed a sense of teleological perfectibility as the peripety of evolution through the mechanism of natural selection. In 1882, Reverend E.H. Dewart validated the prior statement when he argued in *The Christian Guardian*: "the utmost that evolution can do is to carry the design further back and make it a little more comprehensive. The teleological value of each particular adaptation in nature is not destroyed but magnified when it is referred to universal law, working out a universal harmony and adaptation."³⁰ If anything was to dissolve the fixity of Aristotelian teleology, it was non-Euclideanism, not Darwinism.

Euclid's system was fundamentally *a priori* absolutistic and deductive. Purcell implicitly argues, seemingly along the lines of Dewey, that Darwinism came first and then the acceptance of non-Euclideanism second in the social sciences. Purcell argues that these non-Euclidean postulations did not penetrate the social sciences until the 1920s.³¹ Purcell argues that the metaphor of non-Euclideanism,

allowed the intellectuals of the twenties and thirties to accomplish from a previously unexploited foundation three things dear to their hearts. It provided the an ideal way to undercut all pretensions to *a priori* and absolute knowledge; it allowed contradictory and often striking new postulates to be put forward as the basis for various fields of social research; and it made empirical investigation the undisputed foundation for all knowledge and the validating criterion of all theory.³²

Darwin had demonstrated all three of those ideals since the release of *On the Origin of Species* in 1859. Thus, it seems a falsity to argue that non-Euclideanism was prominently applied in the twenties and thirties, when it is clearly evident that Darwin implicitly applied the use of such theory in 1859.³³ As a result, it is important to stipulate that the argumentation of John Dewey should be revised to argue that the epoch of questioning the fixity of the universe did not come with Darwin, but with the discovery of non-Euclideanism in 1826.³⁴

To bring this argument further, in the early 20th century, Albert Einstein in *The General Theory of Relativity* argued that that Euclidean geometry did not completely describe the physical universe.³⁵ Einstein overruled even Newtonian science, by leaving the realms of Euclidean geometry, with his correct predictions regarding the solar eclipse of May 29, 1919.³⁶ Philosopher Morris Cohen argued in the early twentieth century the implications of non-Euclidean geometry could clearly be seen: Kantians had lost their absolute logical necessity for material principles as once evidenced by Euclid and Newton; everything was changing. Non-Euclideanism satisfactorily explained for social scientists the nature of human reasoning and thus "robbed every rational system of any claim to be in any sense true, except insofar as it could be proved empirically to describe what actually existed."³⁷ There is no correlation between any of the groundbreaking claims of Einstein, Niels Bohr's principle of complementarity, or Werner Heisenberg's uncertainty principles that were evolved from the paradigm shift of Charles Darwin; but rather, they were derived from the paradigm shift of non-Euclideanism in 1826.

Stephen Jay Gould argues in *The Panda's Thumb* that even Darwin did not shift his own paradigm or even the cultural paradigm when he released the *Origin of Species*.³⁸ The day before *Origin* hit the bookstands, Darwin received a letter from Thomas Huxley wherein Huxley told Darwin that he had "loaded [himself] with an unnecessary difficulty in adopting *natura non facit saltum* [nature does not make leaps]."³⁹ This particular phrase was attributed to Charles Linnaeus who was an advocate of gradualism in geology. Darwin "portrayed evolution as a stately and orderly process, working so slow that no person could hope to observe it in a lifetime."⁴⁰ Huxley vehemently argued to Darwin that there was no reason to assume that natural selection could not work in a rapid manner. Furthermore, there was no support in the fossil record for gradual change – whole faunas had been wiped out in disarmingly short intervals. According to Huxley and the fossil record, evolution occurred so rapidly that at times sedimentation could not even catch evolution in that act. Gould argues that he does not understand why Darwin chose to follow this view, but he is sure that it is not because of any empirical information. Gould argues:

as monarchies fell and as the eighteenth century ended in an age of revolution, scientists began to see change as a normal part of the universal order, not as aberrant or exceptional. Scholars then transferred the nature of the *liberal* program of slow and orderly change that they advocated for the transformation of society.

To many scientists [such as Darwin] natural cataclysm seemed as threatening as the reign of terror that had taken their great colleague Lavoisier.⁴¹

Darwin, according to Gould, rejected literal appearance and common sense when he argued that the geologic record was exceedingly imperfect and gave way to his own cultural and idyllic bias. Purcell summarises (in regards to the actions of men in this particular era the argumentation) of Thurman Arnold, a Yale Law school professor in the thirties: "rather than

deal candidly with reality, men preferred to create ideal concepts that would explain the world in terms that pleased them. Social and political theories were manifestation of human desires."⁴² Furthermore, Richards argues that the romantic field biology of Darwin and the *hypothetical* force of natural selection were failures to the Baconian objective scientific method. It seems apparent that Darwin's theory was must have been supported by hidden wires. Erik Nordenskiöld argues, "the political sentiments of liberalism [that were exemplified in Darwinian rhetoric] had held a lot of what empirical evidence and scientific reasoning could not."⁴³ To classify Darwin as the measure of scientific objectivity is false. Darwin imported a rather romantic cultural and political agenda of how he wanted the world to be and from that, deduced that gradual change was the mechanism for change, completely disregarding the empirical facticity of the geological record.

Interestingly enough, Darwin's theories of gradualism were either completely misinterpreted by early behaviourists, or perhaps there were not even aware of them. John Watson of the University of Chicago argued in the early twentieth century:

give me a dozen healthy infants, well formed and my own specified world to bring them up in and I'll guarantee to take any one at random and train him to become any type of specialist I might select...regardless of his talents penchants, tendencies, abilities, volitions and race of his ancestors.⁴⁴

Darwin argued that the environment was a catalyst for promoting positive or negative change.⁴⁵ On those grounds, it seems plausible to argue that if you change the environment, you change the individual. Such environmentalism was extremely popular in the early twentieth century. Even fictional novels chronicling the period – Laren Belfers *City of Light* and Caleb Carr's *The Alienist* – are latent with social constructionist and environmental discourse explaining the course of individuals being bettered or worsened by their respective circumstances.⁴⁶ As argued, however, Darwin felt that evolution occurs so slowly that it cannot be observed in one's own lifetime. There is nothing gradual about arguing that human nature has a certain plasticity that can be shaped like putty. The behaviourist claims were some type of neo-Darwinian claim that violates one of the key precepts of Darwinism – gradual and orderly change. To hold Darwin responsible for such a movement seems to be historically and methodologically fallacious.

In conjunction with the behaviourist claims, there was also the neo-Lamarckian eugenicist claims that also attempted to evoke rapid change. Eugenicists repudiated the claims of *laissez-faire* politics (that is latent in Darwin's theories) and argued for forms of artificial selection (which Darwin would have recognized as one of three mechanisms of selection) to intervene against a failing status quo. Papers released in this era, such as the 1921 William McDougal, of Harvard's piece, *Is American Safe for Democracy*, reflect the sentiments of eugenicist and extreme left wing politics, arguing: "the great condition of the decline of any civilization is the inadequacy of the qualities of the people who are the bearers of it."⁴⁷ Involuntary sterilization laws were put into place in over thirty states to prevent the reproduction of socially unfit people.⁴⁸ One could argue that such theorisations were based in Darwinism. However, Degler argues that it was not Darwinism that allowed for both the eugenicist and the behaviourist view. Rather, it was Lamarckianism that permitted this view – "for its emphasis upon use-inheritance, Lamarckianism made it possible to encompass social and organic evolution within a single theory."⁴⁹ In agreement, Shore argues:

Lamarckianism stressed that any change caused by the environment would become part of an organism's racial heritage, it enabled scientific thinkers to use purely biological theories to explain all human cultural phenomena, and psychologists and intellectuals in general to assume that hereditary and environment could not be treated as independent explanations of human nature.⁵⁰

Thus, it seems more plausible that both environmentalism and behaviourism was rooted in not Darwinian, but Lamarckian theory.

This paper has largely called for a revision of the historicist claims regarding the influence of Darwinism. From 1860-1910 there is no doubt that Darwinism was very widely discussed. However, much of what is attributed to be Darwinian largely has its roots in other methodologies such as Baconism, Lamarckianism, and non-Euclideanism. It is important to have a correct perspective of the origins of Darwinism in order to understand the implications of his theory for history and science alike. Regarding the period of 1910-1935, Richards argues:

the Darwinian image of man underwent significant transformation during the twentieth century...in the social sciences, several different movements conspired to eliminate evolutionary theories of mind and behaviour from general discussion and serious investigation. In psychology, the Watsonian behaviourists not only rejected the concept of mind, they banished hereditarian theories and replaced them with empirical theories of environmental control. At the same time, Boas and his disciples in anthropology and sociology shunned evolutionary approaches because of their apparent ethnocentric and racist approaches...in biology, Darwinism itself was abandoned in the rush to perfect the experimental science of genetics.⁵¹

If Darwinism was as remarkably climatic as Dewey believed in 1910 and as Moore believed in 1998, it seems rather odd that while Darwinism is still largely talked about in the academic world, it was quite early on since the early twentieth rarely ever applied. Thus, to view Darwinism as anything more than a dynamic ripple in a very large and diverse era would be an erroneous application that is completely ignorant of the last 150 years that will do little to better, and much to impede, a historicist understanding of one of the most dynamic periods in modern history.

About the Author

I am a 4th Year Honours Undergraduate (Double Major - Philosophy and History) at York University, Toronto ON. I would like to thank Professor Marlene Shore for her encouragements and comments regarding this paper.

Endnotes

1. Carl Degler. *In Search of Human Nature*. (Oxford, Oxford University Press, 1991) p. 3.
2. Randy Moore. "The Persuasive Mr. Darwin." *BioScience*, Vol. 47, No. 2. (1998):107-114. <http://www.jstor.org> (accessed November 30, 2007) p. 107.
3. I interpret the term scientific in light of the impetus for scientific objectivity in the late 19th and early 20th century. Thus, I argue that this claim could be extended to include all disciplines (not just science) that were attempting to be objectively scientific.
4. *ibid*, p 15.
5. Carl Degler. *In Search of Human Nature*. (Oxford, Oxford University Press, 1991) p 6.
6. Trachtenberg, Alan. *The Incorporation of America: Culture and Society in the Gilded Age*, (New York, Hill and Wang, 2007 originally published in 1982) p. xi.
7. *ibid*, p 33.
8. *ibid*, p 88.
9. *ibid*, p 42.
10. *ibid*, p 42 and 90
11. *ibid*, p 70.
12. Marlene Shore. *The Science of Social Redemption: McGill, The Chicago School, and The Origins of Social Research in Canada*. (Toronto, University of Toronto Press, 1987, p. 80)
13. Richards, Robert. *Darwin and the Emergence of Evolutionary Theories of Mind and Behaviour*. (Chicago, University of Chicago Press, 1987. p 73)
14. Novick, Peter. *That Noble Dream: "The Objectivity Question" and the American Historical Profession*. (Cambridge, Cambridge University Press, 1998. p 31)
15. *ibid*, p 34.
16. Moore, "The Persuasive Mr. Darwin", p. 112.
17. Novick, *Noble Dream*, p. 34-35.
18. It will later be shown on p 9 & 10 that Darwin actually proceeded in his research from principles of deduction, not induction, and thus is not actually a good measure of Baconian objectivity.
19. Cook, Ramsay. *The Regenerators; Social Criticism in Late Victorian English Canada*. (Toronto, University of Toronto Press, 1985.) p. 11 Cook presents multiple figures in his work that resemble the sentiments of William Dawson. The first ¼ of his book chronicle the discussion of figures like Dawson. It is important to note that Dawson was not the majority view. There were other figures such as Robert Adams or Benjamin Fish Austin who argue that Darwinism and Christianity could be amalgamated to form a more all-encompassing religious position.
20. Moore, "Persuasive Darwin", p. 112.
21. *ibid*. p 113.
22. More than likely, Darwin used such language in order to gain acceptance with the culture of his time.
23. Richards, *Darwin*, p. 6.
24. Jackson Lears. *No Place of Grace: Antimodernism and the Transformation of American Culture*. (New York, Pantheon Books, 1981, p 41)
25. *ibid*. p 37.
26. However, as will be evidenced on p. 9-13, I believe that much of Darwinian theory was misappropriated.
27. Shore, *Science of Redemption*, p 82.
28. *ibid*.
29. Eric Bell (as quoted by Edward Purcell) *The Crisis of Democratic Theory: Scientific Naturalism & the Problem of Value*, (Kentucky, University of Kentucky Press, 1973, p 60). Purcell argues that bell was widely read and respected by American Social scientists and philosophers alike. He argues that this book was one of the most characteristic books of the early 1930's, and thus I feel it serves as a good indicator of cultural sentiments. The intellectual landmarks were first the discovery of measurement by the Egyptians; second, the discovery of Pythagoras coupled with the systems of deductive logic as proposed by Aristotle and Euclid which were said to prescribe the laws of human nature and reveal the essential nature of reality, third was non-Euclidean geometry, and fourth was multi-valued logic in the 1930's.
30. Cook, *The Regenerators*, p 15.
31. Purcell, *Crisis*, p. 54.
32. *ibid*. p. 61.
33. I will agree that it reached a climax in the twenties and thirties, but will not concede to an argument that it was not being abundantly applied before this period by the likes of Darwin, and other social scientists itself.
34. While some might argue that I am being trivial, and should accept Darwin as the pinnacle of a paradigm shift, I think it is anachronistic reasoning to not give credit where credit is due: non-Euclidean postulates.
35. *ibid*. p 50.
36. *ibid*. p 52.

37. *ibid.*
38. Stephen Jay Gould. *The Panda's Thumb: More Reflections in Natural History*, (New York, W.W Norton & Company Inc, 1980) p. 180
39. *ibid.*, p. 179
40. *ibid.*
41. *ibid.*, 180.
42. Purcell, *Crisis*, p 112.
43. As quoted by Richards, Darwin, p 553
44. As quoted by Richards, Darwin, p 506
45. Degler, *Human Nature*, p 7.
46. Lauren Belfer. *City of Light*, (New York, Bantam Dell Publishing Group, 2000) & Caleb Carr. *The Alienist*. (New York, Bantam Books, 1995.)
47. As quoted in Degler, *Human Nature*, p 44.
48. *ibid.* p. 45-46.
49. *ibid.* p. 93.
50. Shore, *Science of Social Redemption*, p 113
51. Richards, Darwin, p 543.

References

- Belfer, Lauren. *City of Light*, New York, Bantam Dell Publishing Group, 2000.
- Carr, Caleb. *The Alienist*. New York, Bantam Books, 1995.
- Cook, Ramsay. *The Regenerators; Social Criticism in Late Victorian English Canada*. Toronto, University of Toronto Press, 1985.
- Degler, Carl. *In Search of Human Nature*. Oxford, Oxford University Press, 1991.
- Gould, Stephen Jay. *The Panda's Thumb: More Reflections in Natural History*, New York, W.W Norton & Company Inc, 1980.
- Lears, Jackson. *No Place of Grace: Antimodernism and the Transformation of American Culture*. New York, Pantheon Books, 1981.
- Novick, Peter. *That Noble Dream: "The Objectivity Question" and the American Historical Profession*. Cambridge, Cambridge University Press, 1998.
- Moore, Randy. "The Persuasive Mr. Darwin." *BioScience*, Vol. 47, No. 2. (1998): 107-114. <http://www.jstor.org> (accessed November 30, 2007).
- Purcell, Edward A. Jr. *The Crisis of Democratic Theory: Scientific Naturalism & the Problem of Value*, Kentucky, University of Kentucky Press, 1973.
- Richards, Robert. *Darwin and the Emergence of Evolutionary Theories of Mind and Behaviour*. Chicago, University of Chicago Press, 1987.
- Shore, Marlene. *The Science of Social Redemption: McGill, The Chicago School, and The Origins of Social Research in Canada*, Toronto, University of Toronto Press, 1987.
- Trachtenberg, Alan. *The Incorporation of America: Culture and Society in the Gilded Age*, New York, Hill and Wang, 2007 (originally published in 1982).