"MONOGRAPHS ON THE UNIVERSE": ERNST HAECKEL'S EVOLUTIONARY MONISM IN AMERICAN CONTEXT, 1866-83

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Abstract

by

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Ernst Haeckel was one of the nineteenth century's most famous and influential scientists, and science popularizers. According to one historian of biology, he was "the chief source of the world's knowledge of Darwinism" in his time. He was also one of the chief sources of the world's knowledge of what has come to be called, in our time, the "conflict thesis" in the history of science and religion. At the same time, he endeavored to set up his own Darwinian-romantic theology, the forgotten religion of monism, in the place of Christianity. This paper makes use of new information technologies to gather documents which have been largely inaccessible in the past, on account of the difficulty of finding and sorting them. It aims at a comprehensive discussion of Haeckel's influence in the United States at this time – with lay people, with clerical audiences, and with other scientists. I find that Haeckel's ideas met with a poor reception in the United States, because they faced a steep "cultural gradient," as between the monarchical, romantic, and sharply anti-Catholic values prevalent in Haeckel's native Prussia, and the democratic, empirical, and mildly anti-Catholic values prevalent in the United States. In the "struggle for their existence," Haeckel's evolutionary monism faced superior competition from evolutionary world-explanations which originated within an Anglo-American context, and which were, in consequence, better "adapted," so to speak, to their "environment."

Introduction – Ernst Haeckel and his Influence

Ernst Haeckel (1834 – 1919) was one of the most influential public intellectuals of the latter half of the nineteenth century.[1] Like his friend, Thomas Henry Huxley (1825 – 95), he was both a scientist and an author of books for educated laymen, who combined Darwinian biology, anticlerical polemics, and an arresting style to reach a broad audience. Also like Huxley, he thought of himself as a champion of reason, progress, and secularism as against the benighted forces of superstition, reaction, and faith. The two men were divided, however, by theological differences. Huxley took an either/or approach – science being the domain of knowledge, and theology that of ignorance, the advance of the former necessarily entailed the retreat of the latter. By contrast, Haeckel took a both/and approach – science being the foundation and vanguard of knowledge, where it advanced other disciplines must follow. For both, science was interesting for its own sake, certainly, but more importantly for the reform of knowledge and society generally. They set out to change the world.

Haeckel's firebrand approach to popular science writing had at least three sources: enthusiasm for Darwinian biology, despair and anger at the unexpected death of his wife while they were both still young, and a romantic inclination toward bold expression and big ideas. Shortly after completing his habilitation at the University of

1. Mario A. Di Gregorio, *From Here to Eternity: Ernst Haeckel and Scientific Faith* (Göttingen: Vandenhoeck & Ruprecht, 2005), 17, 499-500; Nick Hopwood, *Haeckel's Embryos: Images, Evolution, and Fraud* (Chicago: University of Chicago Press, 2015), 249-50; Erik Nordenskiöld, *The History of Biology: A Survey*, 2nd ed. (New York: Alfred A. Knopf, 1929), 505; Robert J. Richards, *The Tragic Sense of Life: Ernst Haeckel and the Struggle Over Evolutionary Thought* (Chicago: University of Chicago Press, 2008), 2-3, 223, 440-44.

Jena in 1861, and just as he was beginning a promising academic career, he encountered Darwin's *Origin of Species* in the German translation of the paleontologist H. G. Bronn.[2] He was quickly and passionately converted to evolution by natural selection, and gave the first defense of Darwin in a German academic context in a speech in Stettin shortly thereafter. In 1864 his dearly-loved wife contracted an undiagnosed condition, possibly appendicitis, and he suddenly found himself a widower. On that same day, Haeckel's thirtieth birthday, he received news that he had been awarded a prestigious academic prize, which promised swift promotion.[3] A day of joy became, instead, one of mourning. This situation, grievous enough in itself, was compounded by Haeckel's passionate temperament and his romantic upbringing. Authors like J. W. Goethe, whom he adored (and whom he would go on to portray as a precursor to Darwin) had portrayed the violent expression of emotion, up to and including suicide, as the stigmata of superior refinement. Haeckel responded very much in this fashion, and friends and family feared he might take his life.

When he recovered (to the extent that he did) he threw himself into his work. His hope was not only to establish the truth of Darwinian biology, but to reform the whole of culture on the basis it provided. His aim was nothing less than a complete and scientific explanation of existence – a Darwinian theology which would lead to s secular and enlightened culture. Despite its universal ambitions, however, Haeckel's system of explanation was shot through with a highly-personal sense of grievance. He was always keen to emphasize the suffering inherent in all life, and its foundation in harsh and

2. Richards, *Tragic Sense*, 68-69.

3. *Ibid*., 105-106.

unremitting struggle.[4] Christian theology in general, and Catholic theology in particular, tended to attract his ire, for he saw in Christianity a powerful force dedicated, in principle, to the destruction of all his values. Nevertheless, in his system of thought good must come from evil. Just as the fierce combat between different kinds of organism had eventually given rise to the highest and most perfected type, the European races, so out of his fierce struggle against Christian theology the new, Darwinian theology, and the secular and enlightened society of the future, must emerge.

The German Empire and the United States were very different countries. The German Empire was a hereditary monarchy, the United States a Republic. The German Empire was divided between a Protestant majority in the north, and a Catholic minority in the south; the United States was largely (though hardly exclusively) Protestant. The framework for intellectual life in the United States was set by the empirical philosophies of John Locke, David Hume, and Adam Smith, and had been shaped by enthusiasm for the Enlightenment; in the German Empire it was set by the romantic-idealist philosophies of Immanuel Kant, G. W. F. Hegel, and J. W. Goethe, and had been shaped by rejection of the Enlightenment. Yet these countries also had much in common. Both the German Empire and the United States were undergoing profound and rapid changes in the latter half of the nineteenth century. In both, the Second Industrial Revolution was subsuming craftsmen, farmers, and small business owners into immense corporate enterprises, while the rail road and the telegraph were having a similar effect on local and regional markets.

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4. Ernst Haeckel, *The History of Creation, or, The Development of the Earth and its Inhabitants by the Action of Natural Causes* …. 2 vols., trans. E. Ray Lankester (New York: D. Appleton, 1876), v. 1, 20 http://hdl.handle.net/2027/chi.27459469; Ernst Haeckel, *Freedom in Science and Teaching: From the German of Ernst Haeckel* (London: C. Kegan Paul & Co., 1879), 93; Ernst Haeckel, *The Evolution of Man: A Popular Exposition, Principle Pints of Human Ontogeny and Phylogeny, from the German of Ernst Haeckel*, 2 vols. (New York: D. Appleton & co., 1879), 112.

In both, autonomous regional governments were being subordinated to a central authority in the aftermath of wars of national unification. In both, Christian ministers and theologians had recovered, in the early nineteenth century, much of the ground that had been lost to Enlightenment rationalists in the late eighteenth, subduing but hardly vanquishing their opponents in that multi-generational struggle. With the advent of Darwinian biology, the initiative passed to the Enlightenment rationalists once again, where, arguably, it has remained to this day.

Darwinian biology made its first appearance in the United States in 1859, and in the German Empire in 1861. In both, its initial reception, by the public, was shaped largely by Haeckel's presentation of it. He was, as we have seen, one of its earliest and most enthusiastic converts. In true Darwinian fashion, both Darwinian biology and Haeckel's popular rendering of it, which was inextricably tied to his theological project, had to "struggle for their existence." And, just as in the "struggle" between organisms, so also in the "struggle" between ideas, the outcome was not simply a matter of individual characteristics, but of holistic interrelations. In Darwinian biology, for instance, a penguin is fit in the Antarctic, but not in the Sahara, as the climatic and other conditions determine. So too a scientific or a theological idea may be thought of as "fit" in some times and places, and "unfit" in others, as the willingness of the people who live there to give the idea a sympathetic hearing, to see something of themselves reflected in it, and to stake their personal success on the success of the idea, determine.[5]

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5. The analogy must not be pushed past the breaking point – there is no general theory of intellectual history to match Darwin's in evolutionary biology, and, if ever there were, it would almost certainly be quite different from Darwin's. History is not an annex of evolutionary biology. But as both evolutionary biology and intellectual history are idiographic sciences, and as such concerned with the interpretation of unique, non-repeatable events in relation not only to the particular actions of particular individuals, but to the totality of their circumstances – or, in other words, to their context – there are after all useful analogies to be drawn. Historical explanation, like evolutionary-biological, is both reductive and

Haeckel's ideas appeared in the United States during the years 1866-83 in at least two aspects – as straightforward explanations of Darwinian biology, and as the foundations for a more general theological system. In the first of these areas it had few competitors, and was quite successful. Hardly anyone could explain Darwin with the same clarity and enthusiasm as Haeckel, and his books sold briskly as a result.[6] In the second aspect, it had numerous competitors and was not as successful. Its evolutionary teleology and promises of unlimited progress made it attractive to many educated lay Americans, but these were common features of attempts to assimilate Darwinian biology to already-existing theological and philosophical systems, and hence conferred no special advantages on Haeckel's. His materialism, and his bitter anticlerical and anti-Christian polemics, made his ideas unattractive to clerical audiences. His penchant for taking artistic license with embryological drawings, his repeated abuse of the well-regarded Louis Agassiz, and his romantic-speculative tendencies – particularly regarding the simian ancestry of human beings and the emergence of life from "non-living" (Haeckel did not quite recognize the distinction) matter, which, though well-established today, were widely regarded as speculative and unempirical at the time – made his ideas

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holistic, in consequence of the idiographic concern which they share. Just as the evolutionary trajectory of different organisms is in fact a shorthand way of speaking about the particular actions of particular organisms, so too the historical trajectory of different ideas (and other objects of historical inquiry) is a shorthand way of speaking about the particular actions of particular historical actors. So, too, as in evolutionary biology the different ecological contexts in which organisms do or do not thrive account in part for their evolutionary trajectory, so in intellectual history, the differing historical contexts in which ideas were produced and circulated account in part for their historical trajectory.

6. Gregorio, *Eternity*, 228; Richards, *Tragic Sense*, 2. Competition to occupy this "niche," so to speak, might have arisen between Haeckel and Huxley. Huxley, however, was not so much convinced of Darwinian biology as he was of the larger naturalistic viewpoint within which Darwin was operating, and tended to paper over the difference between them on his way to more exciting topics. The result was that "Darwin's bulldog" was not a very prominent source of information about Darwinian biology itself, notwithstanding he was in the van of polemical combat about it. See Matthew Stanley, *Huxley's Church & Maxwell's Demon: From Theistic Science to Naturalistic Science* (Chicago: University of Chicago Press, 2015), 28.

unattractive to scientific audiences, who were prepared to accept natural selection but not necessarily some of its further implications. And all of these features together made them unattractive to the broad public, for whom Protestantism was for the most part taken for granted, and who had much more restricted notions of the proper domain of science then are current in our time. Hence Haeckel's theological ideas, which were controversial enough in the German Empire, were simply alien in the United States. His larger project could not adequately fill the "niche," so to speak, toward which it was directed, that of providing a scientific master-key to meaning for a society undergoing rapid changes toward nationalization, industrialization, and secularization, for that niche substantially did not exist in the United States. The result was that Haeckel was read, not primarily for Haeckel, but for Darwin.[7] His larger theological project had little influence, except, perhaps, to make Americans warier of Darwinian biology than they otherwise might have been.

Historiography and Method

As Mario Di Gregorio has observed, despite his great fame in his own lifetime, Haeckel "would have been very surprised probably to find that very soon he was to be completely forgotten by the public."[8] It is indeed remarkable how little scholarly attention this important intellectual has received until quite recently. What attention he

7. Erik Nordenskiöld considered Haeckel's Natural History of Creation "the chief source of the world's knowledge of Darwinism." *History of Biology*, 515.

8. Gregorio, *Eternity*, 544.

had previously received had largely been from Daniel Gasman, whose book, *The Scientific Origins of National Socialism*, was virtually the only English-language title available for a generation.[9] Gasman's portrait of Haeckel has been quite grim. In his view "Haeckel's prophetic synthesis of romantically-inclined Volkism with evolution and science … provided an ideological basis for National Socialism," in light of which his ideas "may be fully understood."[10] Gasman's view of Haeckel's scientific influence was equally negative: "Although he considered himself to be a close follower of Darwin, there was, in fact, little similarity between them … [Haeckel] ultimately helped to deny Germany a true Darwinian revolution."[11] Despite the mixed reviews with which it was greeted, Gasman's *Scientific Origins* had considerable influence on a generation of scholarship. Modern scholarship unites, however, in rejecting his thesis, on the grounds that it is monocausal, anachronistic, and based on insufficient evidence.[12] Though harsh, this assessment seems just. Haeckel's thought did have worrying tendencies, towards eugenics and "race science," but ideas such as his were widespread at the time, and Gasman has not shown a direct causal link. Instead, he has relied on friend-of-friend associations and comparisons between Haeckel's ideas and those of other intellectuals who were more directly involved in the National Socialist movement. This method could show that any number of Wilhelmine intellectuals were "proto-Nazis" whose ideas "may

9. Stephen Jay Gould's book, *Ontogeny and Phylogeny*, has also discussed Ernst Haeckel, but as it is almost exclusively concerned with one aspect of Haeckel's work, his "biogenetic law," and reliant on Gasman's *Scientific Origins* for biographical and contextual information.

10. Daniel Gasman, *The Scientific Origins of National Socialism: Social Darwinism in Ernst Haeckel and the German Monist League* (London: Macdonald & Co., 1971), xxxviii.

11. Gasman, *Scientific Origins*, 10-11.

12. Gregorio, *Eternity*, 561; Richards, *Tragic Sense*, 448-53; Richard Weikart, *From Darwin to Hitler*: *Evolutionary Ethics, Eugenics and Racism in Germany* (New York: Palgrave MacMillan, 2004), 70.

be fully understood as a prelude to the doctrine of National Socialism," and hence it cannot establish that any one of them was especially influential in this regard.

In *The Tragic Sense of Life,* Robert Richards has largely been concerned to rescue Haeckel's reputation from Daniel Gasman, Richard Weikart, Michael Richardson, and other scholars who have taken a dim view of Haeckel, who was, in Richards' view, "Darwin's authentic intellectual heir," and, "undeniably, a scientific and even an artistic genius."[13] When evaluated fairly, Richards has argued, the power of Haeckel's intellect and the magnitude of his accomplishments cannot be denied.[14] Of course he also had nothing to do with National Socialism. In Richards' view, it is only religious fundamentalism, opposition to Darwinian biology, careless scholarship, and other vices, that makes people think otherwise.[15] Rightly understood, Haeckel was the great, unacknowledged, sadly-tarnished genius of the nineteenth century, whose merit lay not only in his advocacy of Darwinian biology, but in his opposition to all things clerical and ignorant.[16] Richards' biography is difficult to evaluate. On the one hand, it contains a great deal of valuable information, which has not previously been available in the English language. Its account of Haeckel's life-long pathos over the death of his young wife, and its impact on his temperament and science, is persuasive. As he has rightly insisted, Haeckel should not be regarded as a "proto-Nazi."[17] On the other hand, it is unbalanced. Like Haeckel's own writing, it veers between extremes of joyful adulation and bitter

13. Richards, *Tragic Sense*, 376, 8, 439.

14. *Ibid*., xviii, 108, 166, 439.

15. *Ibid*., 448-53.

16. *Ibid*., xviii, 108, 111, 351, 398-403, 439, 500-3.

17. *Ibid*., 448-53.

invective.[18] It displays certain teleological and moralizing tendencies which tend to weaken his overall arguments.[19] The methodological and rhetorical sophistication deployed throughout undermine, rather than assist, the argument, because the relentless selectivity with which they are employed suggests a plan of exoneration rather than an effort at impartial examination.[20] It is the difference, in other words, between a detective investigating an incident and a lawyer arguing for acquittal at trial. The end result is a work which is certainly valuable, but needs to be approached with caution.

In *From Here to Eternity*, Mario Di Gregorio has steered a middle course, understanding Haeckel as neither a "proto-Nazi" nor "Darwin's authentic intellectual

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18. Applied to Haeckel: "genius … startling creativity, tireless industry, and deep artistic talent … extraordinary depth, scope, and influence" (xviii), "spewed fire and ash over the enemies of progress" (108), "genius of enormous creative power" (166), "torch lighting the way to emancipation … illuminated the path to freedom." (371) Applied to Haeckel's and/or Richards' opponents: "encrusted thought" (xix), "the scientifically benighted and religiously stupefied" (111) "righteous rage … hyperbolic reactions" (269) "venomous political creatures" (344) "benighted minions of the anti-progressive and superstitious" (351), "with negligible evidence … without scholarly scruple" (449), "historians of smaller imagination" (502), "sputtering convulsions" (506), etc.

19. On teleology: "had Charles Darwin or Ernst Haeckel not lived, I believe that in due course a theory of evolution by natural selection would have been formulated … It is certainly not unreasonable to suppose that, absent Darwin, that both of these ideas – descent with modification and natural selection – would have rather quickly become dominant in biological science during the alter part of the century. Why would they become dominant? Well, because, as the best evidence we have shows, they conform to features of the natural world. … So I reject the so-called contingency thesis proposed by several sociologists. The thesis itself cannot, I think, even be coherently expressed." (13-14) Thus, in Richards' view, the core mechanism of Darwinian biology was bound to be discovered sooner or later because it is true, because biological science has an innate tendency which constitutes the true historical explanation for the modification of its theories over time.

On morality: the second appendix of the book is entitled "The Moral Grammar of Narratives in the History of Biology." (489-512) In it he writes: "the demand that historians disavow moral evaluations neglects a crucial aspect of the writing of history [which is that] the deep grammar of narrative history requires that moral judgments be rendered" (491) … "Do historians make normative judgments in their history, and should they? I will argue that not only should they, they must ... the historian, therefore … must employ norms governing … the moral context." (498) Thus for Richards moral judgment and historical narrative are inseparable. The moral judgment which informs this history specifically is that Haeckel was the shining hero of Darwinian biology (*loc. cit.*), who has been cruelly maligned by a wicked coterie of the "the enemies of progress" (108) and "the scientifically benighted and religiously stupefied" (111) on the one hand, and by "historians of smaller imagination" (552) who are "without scholarly scruple" (449) on the other. There are many other descriptions of this kind throughout the book.

20. *Ibid*., 13-16, 231-32, 303-12, 448-54, 489-512.

heir," but a scientist whose principle focus was on the creation of a naturalistic, Darwinian theology.[21] Once realized, Haeckel believed, it would become the basis for a new and genuinely scientific culture. It amounted to a plan for a second, quite different, Reformation.[22] The radicalism of this program was apparent rather than real, however. Despite Haeckel's aggressive rhetoric, what it meant in practice was reaching conservative, romantic conclusions on the basis of new, Darwinian biology, or, in other words, submerging rather than developing the genuine novelty of a Darwinian approach. In fact, Gregorio has argued, Haeckel did not understand Darwin, but simply called himself a Darwinian because it was vital to his theological program, and to his sense of who he was as a person.[23] Beneath his "militant scientific fundamentalism" lay a weak, emotionally-demanding of character.[24] Gregorio's argument is thoroughly researched and persuasively argued.[25]

In terms of methodology, these historians have followed the custom of writing history of science from the standpoint of the scientists themselves, seeking to place their thought within the broader development of science, on the basis of their own writings and those of the people with whom they were in regular contact. This is of course a good and necessary way to approach the history of science. It is also one that is strongly

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21. Gregorio, *Eternity*, 19, 92, 105, 200-1, 261, 364-76, 489-98, 569, 570-74.

22. *Ibid*., 22-23, 364-66, 402-3, 490, 497, 549-52, 560, 574.

23. *Ibid*., 21-25, 27-29, 497, 560-63.

24. *Ibid*., 19, 552-60, 574.

25. *Ibid*., 508, 526, 545, 549-51. Nick Hopwood's book, *Haeckel's Embryos*, is also highly relevant, but is a history of Haeckel's *images* rather than of the man and his ideas. Articles and books which contain chapter-length discussions have also been omitted from this review, but drawn on when appropriate.

encouraged by the prior arrangement of the archival material with which historians work. In the case of Ernst Haeckel, for instance, the vast majority of the relevant documents are located at the Haeckel Haus in his hometown of Jena, so it is only natural to begin with these documents, and expand outward as necessary. Indeed, until quite recently it may have been quite difficult to pursue any other approach.

Technological developments over the last decade, however, have provided exciting new opportunities for historical research. According to court documents produced during the legal dispute between Google and the Author's Guild, between 2004 and 2013 Google Books digitized more than twenty million volumes, or in other words about one-sixth of the world's estimated total.[26] Often these have been stored in formats which allow for key-word searches, making it possible to begin from a different arrangement of the material. The perspectives of once-obscure historical actors can be recovered and analyzed in ways that were not previously possible, with the result that prominent scientists, such as Ernst Haeckel, can now be viewed from the outside-looking-in, as opposed to the more traditional approach, of writing from their own perspective – or, so to speak, the inside-looking-out. In this respect, the position of the historian (of the nineteenth and early twentieth centuries, at any rate) is similar to that of nineteenth-century biologists first encountering powerful new microscopes. The object of their study was present all along, but only became accessible with the advent of new technologies. An entire world of discovery awaits.

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26. Authors Guild, Inc. vs. Google, Inc., 1 (S.D. N.Y. 2013). https://www.scribd.com/document/184162035/Google-Books-ruling-on-fair-use-pdf; "Books of the World, Stand Up and be Counted! All 129,864,880 of You," *Google Book Search*, August 05, 2010, http://booksearch.blogspot.com/2010/08/books-of-world-stand-up-and-be-counted.html.

My approach has been to use this method to search for any and all mentions of Ernst Haeckel at the outset of his emergence into American intellectual life, both in the Hathi Trust digital archive and in the bibliographies of scholarly and scientific works, past and present. The first such instance which I have been able to locate occurred in 1866, when the marine invertebrate zoologist Alexander Agassiz, writing for *The Annual Repot of the Trustees of the Museum of Comparative Zoology at Harvard College*, mentioned him in reference to certain aquatic specimens which the museum had recently received from the University of Jena, where he and his mentor, Karl Gegenbauer, were located.[27] Certainly there were many references after 1883 (the year of the publication of his book, *A Visit to Ceylon*), the cut-off date for this study, but in the event the volume of documents from this period alone has proven so immense that it seemed expedient to divide a more extensive inquiry into several installments. From these thousands, only documents which provided an extended and critical engagement with his ideas were retained. These were divided into four categories: "Haeckel himself," and also "scientific," "clerical," and "secular," the first corresponding to the next section, and the other three to the one after that, and these last three being identified on the basis of their intended audience, rather than of their authorship. A scientist writing for the *Popular Science Monthly*, for instance, would be assigned to the secular, rather than to the scientific, category. These categories were intended only to structure, not to define, the discussion, as of course things are never quite so simple. Within this body of documents, I have tried to find common themes, perspectives, and responses to Ernst Haeckel's work,

27. Alexander Agassiz, "Seventh Annual Report of the Museum of Comparative Zoology, at Harvard College in Cambridge, Massachusetts," in *Annual Report of the Trustees of the Museum of Comparative Zoology, Together with the Report of the Director, Harvard University* (Boston: Wright & Potter, State Printer, 1862-1877), 14. http://hdl.handle.net/2027/hvd.32044106267099

and to place them before the reader. Idiosyncratic perspectives were set to the side, as representing, so near as the evidence indicates, an individual rather than a general point of view.

Haeckel's Evolutionary Monism in German Context

The German Empire was a new creation in the 1870's. It was a result, on the one hand, of several generations of yearning for a national state to deliver the German people from the recurrent dangers of external conquest and internal division; and, on the other, of the bold military and diplomatic strategy of the Prussian minister, Otto von Bismarck. The new state had been created under Prussian leadership, was dominated by the former Kingdom of Prussia, and had transformed its monarch into the German Emperor. Prussians, like Haeckel, therefore could take a special pride in it. They did not forget the lesson that, unlike the failure of the previous attempt at national unification, the Revolutions of 1848, this triumph had been the result of military victory.

For Haeckel, this showed that competition was a necessary and a beneficial element of life, however bitter or cruel it might seem. It was not to be downplayed, but celebrated.[28] After all, struggle had worked out well for the German people, and particularly for Prussians. It was also working out for Haeckel personally, as the perpetual combats in which he involved himself on behalf of Darwinian biology enhanced his prestige as a researcher and an advocate, as the theory was increasingly

28. Ernst Haeckel, *History of Creation*, 68-69.

vindicated. Further, by highlighting the bitterness and cruelty of struggle in nature, Haeckel hoped to undermine the Christian-theological perspective that nature displayed the wisdom and goodness of the Creator.[29] A benevolent and omnipotent Creator would not choose such a conflict-filled, haphazard, and wasteful vehicle through which to bring about His plans, surely. Haeckel had, in short, a great deal at stake in the idea of conflict, and he always tried to emphasize this in his popular science books. The lessons of national unification, the world of life, progress in science, and his own professional advancement united to make the "pitiless and most embittered *Struggle of All Against All*" seem an intrinsically moral and praiseworthy activity.[30]

The unification of Germany by force cried out for its unification by right as well, or in other words for legitimation. Haeckel's evolutionary monism was one way, in potential if hardly in practice, that the newly- and precariously-unified German Empire – divided as it was between states with long traditions of independence; Protestants and Catholics; the Junker aristocracy, the industrial elite, and a growing urban proletariat – might be held together. The new, scientific theology could do what the old, Christian theology could not. In this regard, Haeckel's anti-clericalism was especially relevant. In a typical passage, he wrote:

> And finally, how do matters stand with regard to the morality of the priests who announce themselves as the ministers of God's Word, and whose duty is therefore above all others to carry out the saving doctrines of Christianity in their own lives? The long, unbroken, and horrible series of crimes of every kind which is offered by the history of the Roman Popes is the best answer to this question. And just as these "Vicars of God on earth" did, so did their subordinates and accomplices, so, too, have the orthodox priests of other sects done; never failing to set the practice of their own course of life in the strongest possible contrast to

29. *Ibid*., v. 1, 61-71.

30. Haeckel, *History of Creation*, v. 1, 20. Italics in the original.

> those noble doctrines of Christian love which were constantly on their lips. And as with Christianity so it is with every other religious and moral doctrine …[31]

This denunciation had its roots in Haeckel's Prussian-Protestant background (his parents were Protestants, they had brought him up under the influence of the theologian, Friedrich Schleiermacher, and he retained formal membership in the Evangelical Church until 1910), but it clearly encompassed Christianity as a whole.[32] It had the potential to shake loose wavering Protestants, or to fortify convinced secularists, but it can hardly have held much appeal to cultural (let alone convinced) Catholics, or to convinced Protestants. Haeckel, if not exactly a friend of Protestantism, was at any rate drawing on some of the resources it offered, and taking the side of Protestants against Catholics in Bismarck's *Kulturkampf*. With this background in mind, his anticlericalism should probably be understood both in terms of his advocacy for science education generally, and of the drive for national unification.[33]

Industrialization, too, was an important aspect of the intellectual context of the German Empire. In Haeckel's time it was propelling a new industrial elite, which might potentially challenge the Junker aristocracy, into power. Haeckel believed that Darwinian biology demonstrated the existence of a "law of progress," whereby higher forms of life must arise from lower.[34] By presenting Darwinian biology in this way, as a story of

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31. Haeckel, *Freedom in Science*, 97-98.

32. Richards, *Tragic Sense*, 387; Mike Hawkins, *Social Darwinism in European and American Thought, 1860-1945: Nature as Model and Nature as Threat* (New York: Cambridge University Press, 1998), 143.

33. Haeckel, *History of Creation*, v. 1, 4; Hawkins, *Social Darwinism*, 133.

34. Haeckel, *History of Creation*, v. 1, 16.

progress, Haeckel (a professional and the son of a professional) was in effect presenting himself to the new industrial elite as a spokesman, someone who could give expression to their aspirations to prestige and power, and do so in terms at once scientific and theological.[35] The rise of the higher organisms from the lower, according to the "law of progress" which Haeckel had discovered, replayed in nature (i.e. in God, for the two were one, in Haeckel's view) the story of the industrial elite's own rise from political subservience and (relative) poverty to power and wealth, as did the rise of Darwinian biology against other types of explanation, and the progress of science more generally, in intellectual life.[36] It was an attractive story, perhaps even a necessary one, as the mere possession of power rarely suffices. Biological science was one avenue through which the important task of legitimation could be accomplished.

T. H. Huxley once referred to *Origin of Species* as "a veritable Whitworth gun in the armory of liberalism" – an assessment which was largely vindicated, at least in his own lifetime.[37] The reason was that an exclusively-materialistic and directionless conception of reality was flatly incompatible with both Protestant and Catholic theology. These systems of thought were inextricably bound up with a non-material foundation for reality, since "God is a spirit, and whoever worships him must worship him in spirit," as the Evangelist had put it, and since God's providential superintendence of creation was,

35. Peter Bowler has identified this as a more general strategy of the Darwinian and social Darwinian intellectuals. As he has insisted, following Robert M. Young, "Darwinism *is* social." Peter J. Bowler, *Evolution: The History of an Idea* (Berkeley: University of California Press, 1984), 97-98, 144; Gregorio, *Eternity*, 26.

36. Hawkins, *Social Darwinism*, 144.

37. Quoted in Stanley, *Huxley's Church*, 28.

for both, an elementary and non-negotiable article of belief.[38] If these conceptions were false, then Christianity, as historically conceived by the vast majority of its advocates, learned or otherwise, was as well. To the extent these conceptions were weakened, Christian faith was weakened as well. Huxley, Haeckel, and other secularist could therefore derive advantage in the "culture wars" of their time, which opposed republicanism and secularism to throne-and-altar conservatism, by attacking the concepts of an immaterial consciousness and its providential superintendence of reality. They found Darwinian biology very useful for this purpose. Indeed, Haeckel explicitly gave this as one of his purposes in the preface to *The Evolution of Man*. "In this mighty 'war of culture,'" he wrote (indicating Bismarck's *Kulturkampf* policy),

> affecting as it does the whole history of the World, and in which we may well deem it an honour to take part, no better ally than *Anthropogeny* can, it seems to me, be brought to the assistance of struggling truth. The history of evolution is the heavy artillery in the struggle for truth. Whole ranks of dualistic sophisms fall before the monistic philosophy, as before the chain shot of artillery, and the proud structure of the Roman hierarchy, that mighty stronghold of infallible dogmatism, falls like a house of cards.[39]

Haeckel was not a materialist in the strict sense of the word, nor was he a republican, but he was an ardent secularist, and he saw Darwinian biology in similar terms as T. H. Huxley. "This final triumph of the monistic conception of nature," he wrote, "constitutes

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38. John 4:24. These were the concerns which had led the Princeton Seminary theologian Charles Hodge to equate Darwinian biology with atheism. "Haeckel says that Darwin's theory of evolution leads inevitably to Atheism and Materialism," he wrote. "In this we think he is correct." Charles Hodge, *What is Darwinism?* (New York: Scribner, Armstrong, 1874, 95. http://hdl.handle.net/2027/hvd.32044019200393

39. Ernst Haeckel, *The Evolution of Man: A Popular Exposition, Principle Pints of Human Ontogeny and Phylogeny, from the German of Ernst Haeckel*, 2 vols. (New York: D. Appleton & co., 1879), xxii-xxiii.

the highest and most general merit of the Theory of Descent, as reformed by Darwin."[40] Haeckel always emphasized the incompatibility between Darwinian biology and Christian theology, demanding that his readers make an essentially moral decision between the two, whether they would side with reason, progress, and Darwin, or with superstition, backwardness, and Christ.[41]

In order to demonstrate that this really was the case, Haeckel drew his reader's attention to two inferential results of Darwinian biology. The first was the spontaneous generation of living forms – the simplest and earliest of which was the *moner* – from "non-living" matter.[42] The first of these Monera," he wrote,

> originated … by spontaneous generation, or archigony, out of so-called "inorganic combinations," namely, out of simple combinations of carbon, oxygen, hydrogen, and nitrogen. The assumption of this spontaneous generation, that is, of a mechanical origin of the first organisms from inorganic matter, has been proved … to be a necessary hypothesis.[43]

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40. Haeckel, *History of Creation*, v. 1, 23.

41. *Ibid*., v. 1, 19, 22-23, 37, etc.

42. The distinction between "living" and "non-living" matter requires some explanation. Haeckel understood the *Kraft* of *Kraft und Stoff* in spiritual terms. The force which was inextricably bound up with every particle of matter was in some sense a "life-force," a fragment of will and consciousness, and hence the distinction between "living" and "non-living" matter was one of degree rather than of kind. Haeckel did not believe in the "life-force" of an earlier generation of biologists, i.e. a special "organic soul" inherent in each organism, and, indeed, argued strenuously against it. But he did believe in a very similar concept, as applied to the universe as a whole – a sort of cosmic "life-force," permeating existence just as such. It was the totality of this life-force, understood as inextricably tied up with matter, and exclusive of any other kind of reality, supernatural or otherwise, that Haeckel meant when he used the word "God," or "Nature." It was largely the point of his theology that the two were one. However, as he tended to withhold this element of his thought in his popular science books in the 1870's, perhaps as a tactical move after the failure of his overtly-theological *Generelle Morphology*, in the 1860's, American readers were not privy to these details of his system. He looked, to them, like a straightforward materialist. Hence they understood him to mean that life comes from non-living matter through a natural process, when what he meant was that already-living matter becomes more alive through a natural process, i.e. that it is natural for already-living matter to "self-organize" in this way, as an expression of the cosmic "life-force." Haeckel would develop these ideas more fully in one of his last publications, *Crystal Souls*, which sought to demonstrate the "aliveness" of matter from the discovery of liquid crystal. Nordenskiöld, *History of Biology*, 515; Hawkins, *Social Darwinism*, 134.

43. Haeckel, *History of Creation*, v. 2, 278.

The other result that Haeckel was wanted to emphasize was the simian ancestry of human beings, a subject which he discussed in some depth in his *History of Creation*, and to which he later devoted an entire book, *The Evolution of Man* (the aforementioned *Anthropogeny*, in English translation.) The former appeared in German in 1868, three years before even Darwin's *Descent of Man*, and in English in 1876, making it, from the point of view of Anglo-American readers, the later book, even though it was in fact prior. Haeckel's enthusiasm on this point had the same source as his enthusiasm on the former – it strengthened the hand of materialists, and hence secularists, against Christian theology, and hence also against throne-and-altar conservatism. In *The Evolution of Man*, he wrote:

> The determination of the position of man in nature, and of his relations to the totality of things—this question of all questions for mankind, as Huxley justly calls it—is finally solved by the knowledge that man is descended from animals. In consequence of Darwin's reformed Theory of Descent, we are now in a position to establish scientifically the groundwork of a *non-miraculous history of the development of the human race*. All these who have defended Darwin's theory, as well as all its thoughtful opponents, have acknowledged that, as a matter of necessity, it follows from his theory that the human race, in the first place, must be traced to ape-like mammals, and further back to the lower vertebrate animals.[44]

When Darwin had arrived at similar results, he had left them implicit because he anticipated the resistance that they would generate, and he wanted to bring thoughtful people around to his point of view – whatever their prior commitments. Haeckel took a very different approach. For him, Darwinian biology was useful not only or primarily as an explanation of the world of life, but as a theological and political sword (or, in

44. *Ibid*., v. 1, 6.

Huxley's memorable phrase, a machinegun) in the "culture wars" of his time. It was essential to his purpose to state these inferences as necessary consequences, and to do it as emphatically as possible, since, as we have seen, the "highest and most general merit" of the theory was, in his view, the "final triumph of the monistic conception of nature."[45]

Finally, it must be observed that Haeckel explicitly set himself the task of philosophical synthesis, which, in contextual terms, very often means cultural synthesis – i.e. taking as many aspects of the intellectual life of one's time and place as one can grasp and fusing them into a general and systematic explanation of reality. It means reducing a chaos of plausible ideas to an order of philosophical truth. As Haeckel wrote: "The chief value of their [scientists'] hard-won knowledge of details lies in the general results which more comprehensive minds will one day derive from them."[46] That Haeckel saw himself as just the mind for the task is evident from his writing. "It is true [that Darwinian biology] is only a small fragment of a far more comprehensive doctrine—a part of the universal Theory of Development, which embraces in its vast range the whole domain of human knowledge."[47] In his later books, *The World-Riddle* and *The Wonders of Life*, he attempted to provide this synthesis, largely on the basis of his *General Morphology*, which had not been well-received when it was first published in the 1866.

Haeckel believed that this book, written just a few years after he had first encountered Darwin, had provided the basis for a universal synthesis of knowledge, a new and scientific theology which would stand in the same relation to Martin Luther's

45. *Ibid*., v. 1, 23.

46. *Ibid*., v. 1, 79-80.

47. *Ibid*., v. 1, 1-2.

Reformation as his had to Catholic theology.[48] Its guiding assumption was the "spiritualization of matter," such that the spiritual element of theology was not eliminated, but retained, by being transferred out of the fictitious realm of the supernatural and into the real world of nature – a system of thought very much in the vein pioneered in the 1850's by the "scientific materialists," Karl Vogt, Jacob Moleschott, Ludwig Büchner, and Heinrich Czolbe.[49] The new understanding was, he believed, based primarily on Darwin. In fact, as Mario Di Gregorio has argued, he had grafted Darwinian biology onto the idealistic-romantic tradition he had imbibed from J. W. Goethe, Alexander Humboldt, Friedrich Schleiermacher, and, later, David Friedrich Strauss.[50] The synthesis which resulted from transplanting Darwin's ideas from the Anglo-American, empirical context in which they originated could not but result in a different understanding. When a second link of transmission was added – from Darwin's English context to Haeckel's Germany, and then from Haeckel's Germany to the United States – this understanding could not but go undergo further modification. This double cultural-gradient helps explain why Haeckel's larger, philosophical ideas did not gain the same traction in the United States as they did in the German Empire.

Implicit in Haeckel's writing at this time, and explicit in his later work, was the disestablishment of the Protestant and Catholic Churches within the German Empire in favor of a "Monist League," which would assume all the same functions – a "religion of

48. Gregorio, *Eternity*, 22-23, 364-66, 402-3, 497, 574

49. See Frederick Gregory, *Scientific Materialism in Nineteenth Century Germany* (Boston: D. Reidel Publishing Co., 1977).

50. Gregorio, *Eternity*, 18-27, 34-35, 364-76, 560-64, 547-48.

science" in no metaphorical sense of the phrase.[51] In the "struggle" for finite resources of public admiration and state patronage, Haeckel came to feel confident that monism would eventually win the victory.[52] But monism was only one of the "secular religions" which entered the field against established Christian theology in the nineteenth century. Hence his anti-Christian polemics and his materialism are both explicable, from a contextual point of view, in terms not only of his aspirations, but those of an entire group of ambitious "scientific universe-explainers," so to speak, to exploit the opportunity provided by the advances of science. Darwinian biology was one, though hardly the only, route that such a strategy could pursue. But however it was pursued, the end result would be, it was hoped, quite similar – to put a new system of scientific thought and institutions into the "niche" then-occupied by the state Churches of Germany – that of officially sanctioned, and patronized, "meaning-makers" –, and, hopefully, to dislodge the Christian churches together. Again the cultural gradient would have important consequences for the reception of his views in the United States. In the United States, there was no state church to disestablish, and hence no "niche" of this type to occupy.

Haeckel's ideas were intensely polarizing in his native Germany – welcomed by "freethinkers," socialists, materials, and other groups with "advanced ideas," and of course offensive to the devout and conservative.[53] Other research scientists frequently reacted with scorn and aggression, calling attention to inaccurate drawings, speculation represented as certain fact, and, in the case of his former mentor Rudolf Virchow,

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51. Ernst Haeckel, *Monism as Connecting Science and Religion: The Confession of Faith of a Man of Science*, trans. J. Gilchrest (London: Adam and Charles Black, 1895), 84-89; Nordenskiöld, *History of Biology*, 525; Hawkins, *Social Darwinism*, 144.

52. Haeckel, *Monism*, 70; *History*, v. 2, 367-70; *Freedom in Science*, 88.

53. Nordenskiöld, *History of Biology*, 522-23.

accusing them of being intrinsically democratic and socialistic. Haeckel's ideas had a natural constituency in the German Empire, where anticlericalism, materialism, and liberalism were hotly contested, and hence in need of advocates. As we will see, this was not the case in the United States.

Haeckel's Evolutionary Monism in American Context

When Abraham Lincoln visited Gettysburg, Pennsylvania, several months after the pivotal battle which had been fought there, he told his hearers that the contest they were engaged in was to determine the fate of a great idea. Their nation, "conceived in Liberty, and dedicated to the proposition that all men are created equal," was undergoing a test, which would determine whether "any nation so conceived and so dedicated, can long endure." He closed his short speech with the hope that "government of the people, by the people, for the people, shall not perish from the earth."

Phrases that read as only stale or conventional in our time take on a greater depth and urgency when read against the background of a world largely governed by hereditary monarchies. Even France, the great ally of the thirteen colonies in their struggle for independence, was under the military dictatorship of Napoleon III. It was by no means certain that a "nation so conceived and so dedicated" really could "long endure." If the former "United States" had fractured into competing Northern and Southern successor states, with perhaps further fragmentation to follow, it would have tended to discredit the republican ideal. This was the same ideal that Frederick William, the King of Prussia, had

refused in 1848, when he had rejected the Frankfurt Parliament's compromise offer, of a constitutional monarchy, as a "crown from the gutter," directed the army to stamp out the last embers of rebellion, and thereby protected his own monarchical ideal.

Each ideal proved successful in its own way, at the time. The United States did not splinter into competing Northern and Southern successor states. The Kingdom of Prussia achieved the German dream of creating a national state, and the most powerful in Europe, under the leadership of Otto von Bismarck. In the 1870's, then, both Americans and Germans could look back on their recent past with a certain measure of vindication, with respect to the republican and monarchial ideals, respectively. In both countries, the message of struggle as a "royal road" to progress could meet with a certain (hardly a universal) sympathy.[54]

Haeckel stood on one side of the monarchism/republican divide, and his American readers on the other. His writing was not overtly political, however, except on one question: he was inflexibly and emphatically anti-clerical. The Catholic Church in particular, and Christianity in general, were, in his view, the mortal enemies of reason and progress. The new monistic theology would replace both in time, and bring the age of medieval superstition and tyranny to a close.[55] As we have seen, what this meant in practice was that that monistic institutions were to take the place of the Protestant and Catholic Churches, as recipients of state protection and patronage – especially in the schools. Haeckel was not secular in the modern sense of the word, i.e. of a person who is

54. Gregorio, *Eternity*, 125.

55. Hawkins, *Social Darwinism*, 144.

either apathetic, or opposed, to a role for faith in public life.[56] He did not believe, any more than the most passionate modern fundamentalist, in "the separation between church and state." The question for him was not whether, but which, faith ought to preside over, guide, and bless the German Empire.

Because Haeckel's anticlericalism was offered in this German context, of seeking to take the place of the Protestant and Catholic Churches as the altar in throne-and-altar conservatism, it often seemed to lack a legitimate target when transferred to the American context, where there was no throne and altar conservatism, and hence no established Church, no "altar," for monism to take possession of. An astute reader could read these comments against the background of Haeckel's own context, or in terms of a worldwide struggle between the republican and monarchical ideals, but since Haeckel was in fact a monarchist, since he did not usually address constitutional questions directly, and since his denunciations of Christian theology were so heated, it would have been difficult to avoid applying it to one's own time and place. Denouncing the Catholic Church in particular was unexceptional in an American-Protestants context, but it could also seem shrill and misplaced – especially when his condemnations took in the Protestant confession as well. What, after all, had the local minister ever done to him? Haeckel was not primarily a polemicist, in this regard, however. The crux (so to speak) of his argument was not anti-Christian innuendo, but two inferential results of Darwinian biology: the spontaneous generation of living from "non-living" matter, and the simian ancestry of human beings, neither of which were any more welcome from a Protestant

56. *Ibid.*

point of view than from a Catholic. This was the foundation on which the scaffolding on which his anticlerical and anti-Christian rhetoric was based.

As a consequence of the experience of foreign invasion, domination, and resistance, which Germans experienced during the Revolutionary and Napoleonic wars, an idealistic-romantic philosophy, which was emphatically opposed to the empirical philosophy of the French invaders (it had been imported to France from Great Britain, and to the United States as well), had become inextricably caught up with patriotism in the minds of many German intellectuals, and had come to saturate the culture more generally. We have already seen that Haeckel had grown up in an environment saturated with the influence of German romantic-idealistic philosophy. Indeed, he even believed that Goethe had anticipated Darwin, and strove throughout his long life to associate the two.[57]

In the idealistic-romantic tradition, it was often thought customary, and indeed praiseworthy, to make bold arguments, defend them passionately, and advance them to their furthest reach. The hidden logic of the cosmos could be grasped by an intellect with sufficient daring and originality – and even if the attempt failed, it had, at any rate, something of the heroic about it. There was, implicit in this, a certain morality of rhetoric and of research methods – one that stressed the necessity of courage, of total commitment, as the stepping stone to any truly memorable accomplishment. What this meant for Haeckel was not only that the theoretical findings of a science should be pushed to their extremity, but that extremity should then be used as a basis for a complete

57. Gregorio, *Eternity*, 560; Nordenskiöld, *History of Biology*, 514.

explanation of reality, and that this too should be pushed to its extremity, and advanced with the utmost bellicosity.

Intellectual life in Great Britain and in the United States was governed by very different norms. The empirical philosophies of John Locke, David Hume, and Adam Smith, tended to work in favor of a caution and self-limitation. Rather than beginning from first principles and proceeding by deduction to explain the hidden logic of the cosmos, one began from experience, and proceeded by induction to explain as much as one honestly could of what one had actually experienced. Inferential results from this method could go quite far, as the success of the ideas of these philosophers, and later Charles Darwin, had shown – but even at their furthest extent, what they purported to explain was a limited portion of experience (or, in other words, of the evidence), not the hidden logic of the cosmos. The reach and power of certain ideas arrived at through this method seemed to contain a very different lesson about the morality of research methods – one that emphasized humility and caution, rather than courage.[58]

What Darwin had understood as an explanation for the world of life – an explanatory goal which was audacious enough to make a generation of empirically-minded Anglo-American intellectuals tremble – Haeckel understood as an explanation for reality just as such. It followed from his conception of matter, as not simply inert stuff but living particulates of the world-soul, that explanations which would be called biological in the Anglo-American context would immediately become, for him, metaphysical and theological as well. Matter was alive, and hence had to follow, in some mysterious yet

58. "The influence of romantic natural philosophy comes out most clearly in his [Haeckel's] utter incapacity to grasp the relativity and limitations of human knowledge, which Herbert spencer among others so forcefully and repeatedly emphasized." Nordenskiöld, *History of Biology*, 511.

assuredly-profound sense, the dictates of Darwinian biology. If it was true of the world of life, it had to be true of the world of matter as well, for there was not any fundamental difference. To put things somewhat differently, when an Anglo-American materialist maintains that there is no distinction between living and non-living matter, what he or she means is that life is an ephemera of death, for the fundamental "stuff" out of which life is made is simply dead, inert matter, and life nothing more than a peculiar arrangement of it. Death has priority over life, so to speak. When Haeckel refused, as he often did, to draw this same distinction, what he meant was that death was an ephemera of life, for matter just as such was alive, and hence death only a passing illusion. The individuality of an organism could be destroyed through the disorganization of its structures, to be sure, but its "aliveness" could not, for this was a property of matter, and the cosmos, just as such.[59] Life had priority over death. Both positions acknowledge the unity of life and matter, but they do so on very different terms.

Haeckel was on reasonable ground, both rhetorically, methodologically, and in terms of his hylozoistic theology, within his own German-idealistic context, but his entire way of looking at things was strange stuff indeed for Anglo-Americans. His bold assertions read to American commentators like typically-Germanic, speculative bombast. How, they demanded to know, could he possibly have arrived at such expansive knowledge? Who could inspect the whole of the cosmos on an empirical basis? And why did he need to constantly pound the table in order to get his views across, instead of advancing, Darwin-like, a cautious, inferential chain of reasoning, proceeding from a

59. How the life of an organism could be both a product of its structures and an innate quality of the matter of which it was composed was never entirely clear. *Ibid.*, 515, 19-20. Nordenskiöld writes that Haeckel "could never be induced to take the idea of 'mechanism' in existence really seriously." (512)

mountain of prior evidence? It seemed to them that there was something immoral about what Haeckel was doing. It was arrogant, reckless, and absurd. For Haeckel, it was simply a matter of following the dictates of deductive logic. People were either willing to go where reason took them, and to enter into the combat of ideas (their "struggle for existence," so to speak) wholeheartedly, or they weren't. What sense did it make to blame him for committing to his ideas, or stating them with an emphasis proportionate to their profundity? But his approach was not simply conventional or learned, it was the expression of a genuinely "high-strung" personality, expressed within a cultural context which did much to encourage its expression.[60] This could drive him to excess, even by German-romantic standards.

These countervailing tendencies and assumptions proved a major obstacle for the transmission of Haeckel's ideas to American audiences. The irony was that Haeckel, writing on the basis of romantic-idealistic assumptions, was insisting, he thought, on a thoroughly empirical philosophy, where American commentators were working, although within an empirical context, from the idealistic conception of biology introduced by Louis Agassiz in an earlier generation. Americans had imported their biology, via Louis Agassiz, from a continent and a generation dominated by idealistic philosophy, while Haeckel had imported his, via Darwin, from a Britain dominated by empiricism. It was a case of romantic-idealistic rhetorical strategies and ways of thinking serving an empirical philosophy, and empirical rhetoric and ways of thinking serving an idealistic-romantic philosophy. Perhaps this juxtaposition helps to account for the bitterness of Haeckel's attacks on Agassiz, whom he was still denouncing in 1904, thirty years after the death of

60. *Ibid*., 514.

Darwin's old adversary.[61] By attacking Agassiz in this way, he may have been exorcizing his own idealistic-romantic demons.

The principle argument which American commentators used in order to resist the twin-pronged thrust of Haeckel's assault on Protestant theology, the spontaneous generation of living from "non-living" matter on the one hand, and the simian ancestry of human beings on the other, was to rule them out of court as speculative, unempirical, unscientific, and, in a word, immoral. *The New Englander and Yale Review*'s comments were typical in this regard. An unknown contributor wrote: "To these extremely hypothetical speculations of Haeckel and others concerning the nature of life, we object that they are too easy. There is not a sufficient basis of fact underlying them ... and in the nature of the case [they] cannot be established by any knowledge short of omniscience."[62] His fellow German science popularizer, Karl Vogt, ridiculed Haeckel as "the zoological pope" in an essay for *The Popular Science Monthly*, and complained of "the brusqueness with which he has striven and still strives to impose his exceedingly poetic fancies upon others."[63] "He pushes the development theory to its logical sequence," *The Nation* explained, when "he claims boldly that the formation of the first organisms from inorganic matter is nothing imaginary, since we have as the primordial organized beings those simple albuminous organisms (*monera*) consisting of particles of

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61. Ernst Haeckel, *The Wonders of Life: A Popular Study of Biological Philosophy*, trans. Joseph McCabe (New York: Harper & Brothers, 1905), 352.

62. "The Proper Attitude of Religious Teachers Toward Scientific Experts," in *The New Englander and Yale Review*, vol. 37 (New Haven: W. L. Kingsley, 1878), 784. http://hdl.handle.net/2027/uc1.b3058156

63. Karl Vogt, "Pope and anti-Pope," in *The Popular Science Monthly*, vol. 14: November, 1878-April, 1879, eds. E. L. Youmans and W. J. Youmans (New York: D. Appleton, 1879), 321.

protoplasm which has originated from combinations of carbon, hydrogen, oxygen, and nitrogen." Yet the author was not persuaded, on the grounds that "many of the affinities [Haeckel] points out are very interesting, while others not proved thus far are exceedingly ingenious."[64] *The Princeton Review* had doubts as well. "He requires us to assume many things which he cannot prove," it complained.

> What evidence is there, for example, of the possibility of the development of the rational and moral nature of man from the intelligence and instinct of the lower animals…? What proof is there of the spontaneous evolution of living forms from inorganic matter? … It is evident that so far he is simply a believer in the dogmas of a philosophic creed, and weak as other men whom he affects to despise.[65]

Scribner's, a popular literary magazine, suggested that Haeckel "would have done well to say less concerning the *odium theologicum*, and to display less of the *odium scientificum*" toward those who "resented his assumption of infallibility."[66] *Appleton's Journal*, also a literary magazine, agreed that Haeckel's work displayed "in a marked degree, that tendency which he reprobates in theologians to erect theories into dogmas" and regretted that "Haeckel attributes to simple ignorance the disposition, by whomsoever manifested, to regard the doctrine of Descent as a hypothesis, and not as a demonstrated theory."[67]

Occasionally the explanation for Haeckel's aggression was given in terms of the popular typology of nineteenth century nationalism. According to *The Atlantic* "It cannot

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64. "Natural History of Creation," *The Nation*, March 11, 1869.

65. J. W. Dawson, "Haeckel on the Evolution of Man," in *The Princeton Review*, v. 56: January-June, 1880 (New York, 1880), 447. http://hdl.handle.net/2027/wu.89059492736

66. "Haeckel's Evolution of Man," *Scribner's Monthly*, vol. 19 no. 1, 149.

67. "Books and Authors," in *Appleton's Journal of Literature, Science and Art*, vol. 15: from no. 353-no. 379 inclusive, January 1 to June 24, 1876 (New York: D. Appleton & Co.), 216. http://hdl.handle.net/2027/uc1.c3465656

be said that the German radical's science is always profound … he never suspects that he is superficial, or seems to care whether there is anything to be said on the other side. He is not satisfied with dissenting from your opinion, but has, moreover, the greatest contempt for it, and perhaps for you that you entertain it."[68] *The North American Review* regretted that "The laborious and careful collation of facts, and then the patient and scientific effort to deduce the truth and only the truth from these various phenomena, seems to be a mental position not very familiar to the present scientific mind of Germany."[69] *The Popular Science Monthly* thought some of Haeckel's ideas "quite in the spirit of the false philosophy from the same source that has been so pernicious to German science."[70]

The clerical press was much more hostile as the secular. *The Unitarian Review and Religious Magazine*, in an otherwise sympathetic review from a journal otherwise sympathetic to science and natural theology, warned that "one is always obliged to distinguish between Haeckel's facts and Haeckel's conclusion. … no one takes greater liberty in exercising his poetic imagination than Haeckel."[71] Similarly *The Bibliotheca Sacra*, one of the most important theological journals of the time: "Schmidt and Haeckel

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68. "The Germans in the West," in *The Atlantic Monthly: A Magazine of Literature, Art, Science, and Politics*, vol. 32 (Boston: James R. Osgood and Co., 1873), 465. http://hdl.handle.net/2027/uiug.30112110809727

69. "Carl Vogt," in *The North American Review* (1821-1940); Apr 1870; 110, 227; *American Periodicals*, 284.

70. Emil du Bois-Reymond, "The Seven World-Problems," in *The Popular Science Monthly*, vol. 20: November, 1881-April, 1882, eds. E. L. Youmans and W. J. Youmans (New York: D. Appleton and Co., 1882), 435. http://hdl.handle.net/2027/njp.32101010904744

71. S. J. Barrows, "Ernst Haeckel and His Theory of Development," in *The Unitarian Review and Religious Magazine*, vol. 6 (Boston: Office of the Unitarian Review), 292. http://hdl.handle.net/2027/iau.31858032670311

are too ready to reason upon the subject from *a priori* principles, and are offensively dogmatic."[72]

Samuel Irenaeus Prime, writing for the *New York Observer and Chronicle* under the pen-name "Irenaeus" (which he shared with an early Christian apologist), rejected Haeckel's "moner theory of life," on the grounds that by it "man and beast and potatoes are put on the same level."[73] In other words, he wanted to emphasize the differences that Haeckel wanted to de-emphasize, each for their own theological reasons. Another (anonymous) clerical writer for *The Churchman* was also unimpressed by Haeckel's "complete and circumstantial history of our ancestry … from unicellular monera up to the perfect man. … one who accepts the original postulate, and swallows all the subsequent guesses, will write Q. E. D. after the infallible conclusion."[74] Here again the issues were implausibility and circularity of argument. Haeckel, they complained, was speculating in a way that strained the credulity of a reasonable person.

"The lofty and repeated shrieks of Herr Haeckel," a contributor to *The Methodist Review* warned, "are not so much science as atheism struggling to ensconce itself under a scientific structure."[75] Echoing complaints of speculation from other sources, he wrote that the whole edifice of Haeckel's ideas was held together "with huge lumps of

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72. George F. Weight, "Recent Works Bearing on the Relation of Science to Religion," in *The Bibliotheca Sacra*, vol. 33, eds. Edwards A. Park, George E. Day, J. P. Thompson, and D. W. Simon (Andover: Warren F. Draper, 1876), 453. http://hdl.handle.net/2027/nyp.33433081752416

73. Samuel Irenaeus Prime, "Made Without a Maker," in Samuel Irenaeus Prime, *Irenaeus Letters: Originally Published in the New York Observer* (New York: The New York Observer, 1881), 335. http://hdl.handle.net/2027/mdp.39015010794108

74. "The Infallibilities," in *The Churchman*, v. 39 (Hartford, Conn.: Churchman), 5. http://hdl.handle.net/2027/mdp.39015086588673

75. "English Reviews," in *The Methodist Quarterly Review*, vol. 61-fourth series, vol. 31, ed. D. D. Whedon (New York: Phillips & Hunt, 1879), 753. http://hdl.handle.net/2027/nyp.33433081737920

hypothetical putty."[76] *The Presbyterian Quarterly* set its hopes on progress to clear up the confusion that Haeckel and certain of his science-popularizing colleagues were creating. "Ambitious scientists," the journal argued,

> wise with a little learning, may be expected to precipitate their speculations and conclusions in hasty text-books, and announce their questionable hypotheses as infallible demonstrations. Against this injustice, some of the veterans in science have already uttered the warning; but it is scarcely heeded, and the confusion increases with the clamor of these eager contestants. However contradictory and conjectural may be the conclusions of Pasteur and Pouchet, of Comte and Huxley, of Haeckel and Harrison, of Papillon and Maudsley, the masses confounded by new contradictions and dazzled by glittering generalities do not as yet detect the illusion; and the confusion spreads. This cause, too, will in time regulate itself. Enlarged intelligence will check the popular excitement and the popular susceptibility. Science will master the scientists, and demonstration will supersede disorder.[77]

The principal nuisance was not Darwinian biology, but Haeckel's *diktat* that it could not be integrated into Christian theology, as he was attempting to integrate it into German romanticism. "John Wesley was an evolutionist," *The Methodist Quarterly Review* reminded its readers, explaining that the founder of their denomination believed in a continuous spiritual progression from organic to angelic life. "Here is an evolution more complete than Darwinism presents… Theistic Darwinism is apparently not very anti-Wesleyan."[78] The modern, radically anti-teleological conception of Darwinian biology was apparently as foreign to the Methodist cleric as it was to Haeckel. *The Unitarian Review and Religious Magazine* was not interested in adjudicating biological

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76. *Ibid*.

77. R. B. Welch, "The Prevalent Confusion: And, the Attitude of Christian Faith," in *The Presbyterian Review*, vol. 2, eds. Archibald A. Hodge and Charles A. Briggs (New York: Anson D. F. Randolph & Co., 1881), 263. http://hdl.handle.net/2027/wu.89082557141

78. "Quarterly Book-Table," in *The Methodist Magazine* (New York: J. Soule and T. Mason for the Methodist Episcopal Church in the United States, 1818-1828), 177. http://hdl.handle.net/2027/nyp.33433081737920 178.

questions. "On the final validity of Haeckel's scientific conclusions, I leave the scientists to judge. His theological opinions come within the judgment of a wider circle."[79] The author went on to quote the Anglican minister Sidney Smith, to the effect that knowledge just as such could not be impious, for "whatever secrets of Nature man can discover, he is permitted to discover; whatever cannot be entrusted to him is placed beyond his reach. His efforts may be fruitless, but they cannot be criminal; for it is only by experience he can find out those boundaries which Providence has fixed, and those rewards which it has assigned to his labor.'" *The Bibliotheca Sacra* affirmed that "the scientific doctrine of evolution certainly … only enlarges our conception of the reign of order, and the greater the evidence of that, the stronger the implication of an Ordainer."[80] *The Lutheran Quarterly*, while regarding Darwin's views as yet-hypothetical, nonetheless held

> that some theory of evolution will eventually become an established fact of science is altogether probable…. But that this finally accepted theory will be atheistic, or will be in irreconcilable conflict with the Bible and Christianity, is not probable. … modifications [i.e. to theology] have often been made before without at all weakening our faith in the Bible as the word of God.[81]

None of this is to say that opposition to evolution in general, or to Darwin in particular, was unknown in clerical circles. A commencement sermon reprinted by *The Metropolitan Pulpit* warned the young graduates against the "theories (and only theories) of some godless scientific men," on the grounds that "when these men attempt to construct theories of cosmogony and life they are no longer scientists, but dreamers." By

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79. Barrows, "Theory of Development," 281.

80. "Recent Publications," 785.

81. J. A. Clutz, "Goldwin Smith on the Decay of Faith," in *The Lutheran Quarterly*, vol. 11: New Series, eds. M. Valentine, E. J. Wolf, P. M. Bikle (Gettysburg: J. B. Wible, Printer, 1880), 262. http://hdl.handle.net/2027/iau.31858045038563

"theories of cosmogony and life" it seems likely the speaker meant materialism and Darwinian biology.[82] The Princeton theologian Charles Hodge also argued, in the milestone *What is Darwinism?*, that "Darwin's theory of evolution leads inevitably to atheism and materialism."[83] The Methodist Review went further, thundering: "Atheism plus Darwinism equals Brutalism: the beastliest philosophy to ever nightmare the human soul. Life through all its ranks [according to Haeckel] is hate, war, and destruction; and all living things can say with Job's messengers, 'I alone have escaped to tell thee."[84]

Haeckel had, in a sense, walked into this line of argument. In a typical passage, he had written that "the terrible and ceaseless 'Struggle for Existence' gives the real impulse to the blind course of the world. A 'moral ordering,' and 'a purposive plan' of the world can only be visible, if the prevalence of an immoral rule of the strongest and undesigned organization is entirely ignored."[85] Elsewhere he had written: "the cruel and merciless struggle for existence which rages throughout all living nature, and in the course of nature must rage, this unceasing and inexorable competition of all living creatures, is an incontestable fact."[86]

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82. Howard Crosby, "Baccalaureate Sermon – Peroration," in *The Metropolitan Pulpit and Homiletic Monthly: Containing Carefully Prepared Condensation of Leading Sermons Preached Each Month in New York and Brooklyn, Outlines of Sermons Preached Elsewhere, also other Homiletic Instructions*, vol. 2: From October, 1877 to September, 1878, ed. I. K. Funk (New York: The Religious Newspaper Society, 1878), 330. http://hdl.handle.net/2027/wu.89077078525

83. Charles Hodge, *What is Darwinism?* (New York: Scribner, Armstrong, and Co., 1874), 102. http://hdl.handle.net/2027/hvd.32044019200393

84. "Quarterly Book Table," *The Methodist Quarterly Review* (New York: Published by G. Lane and P.P. Sanford), 102. http://hdl.handle.net/2027/umn.31951d003199172

85. Haeckel, *Evolution of Man*, 112. Also: *History of Creation*, v. 1, 20.

86. Haeckel, *Freedom in Science*, 93.

By constantly emphasizing the brutality and ugliness of nature as part of his attack on Christian theology, he was handing opponents of Darwinian biology a powerful weapon. They could claim, on Haeckel's own authority, that it was ugly, and hence degrading. To biologists this might have seemed a trivial objection, but to commentators who were asked to decide whether or not to commit to Darwinian biology, who did not have the same basis in or concern for the status of the biologist's specialist knowledge, and who were not especially invested in the matter one way or another, but who did care deeply about the moral quality of world they were living in – to these people, this point mattered. One might have insisted, and Haeckel did insist, that recognizing the ugliness of the world was simply the cost of taking the facts seriously, and that it was really only an apparent ugliness which was transformed, at a higher stage of contemplation, into a more profound beauty. Conversely, one might have insisted that the beauty of life, moral and otherwise, was at the same time apparent and profound, and that Darwinian biology must therefore be false. After all, a theory which insists on the ugliness of the world, as part of its opening gambit, when it is in fact beautiful, is liable to be rejected on just those grounds, at least by some commentators. Put differently, Haeckel's argumentative strategy might eventually work, five or six steps in, but if he lost his readers at the first step it was doomed.

Haeckel's decision to present Darwinian biology as intrinsically ugly, at least in the first steps, was primarily a matter of style rather than substance. It was, in other words, a choice, as it was a disputable point whether or not Darwinian biology really was morally or aesthetically ugly, or incompatible with Christian theology. Haeckel thought it was, but there were also commentators who thought the conflict more apparent than real,

and who wanted to incorporate Darwinian biology within a larger Christian perspective. This was precisely what Haeckel wanted to avoid.[87] If the "monistic conception of nature" did not triumph, but was rejected by a system of theology which nevertheless did incorporate Darwinian biology, then the "highest and most general merit" of the theory would be lost. It was in this respect only that Haeckel did not have a choice, since if Darwinian biology was to serve his theological purposes, it had to be weaponized.[88] Darwin's conciliatory approach was, from this point of view, useless.[89]

Clerical writers also took offense at what seemed to them Haeckel's dogmatic and unreasonable approach. *The Unitarian Review* regretted that "our naturalist has been unfortunately weak enough to reflect the spirit of his adversaries … when Haeckel cannot defend his theories by argument he often defends them by epithet."[90] *The Bibliotheca Sacra*, though upholding Haeckel against Virchow in the controversy over teaching evolution in German schools, confessed "repugnance" toward "Professor Haeckel's views and dogmatism."[91]

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87. *Ibid*., v. 1, 23.

88. Nordenskiöld, *History of Biology*, 507.

89. Richards ascribes Haeckel's "militant monistic philosophy" to his lifelong anguish at the death of his wife. (15-16) Haeckel was a "high-strung" individual, and Richards argues persuasively that bitterness and anger over this event shaped the trajectory of his later life and thought. Its deliberate and programmatic element should not be lost in the pursuit of posthumous sympathy, however. The man whom Richards describes as a "genius" in numerous places (33, 166, 442, etc.) knew what he was about. He was not simply criticizing Christian theology, he was trying to set up his own monistic theology in its place – not so much for, as *through*, Darwinian biology.

90. Barrows, "Theory of Development," 293.

91. "Notices of Recent Publications," in *The Bibliotheca Sacra*, vol., 36, eds. Edwards A. Park, George E. Day, Archibald Duff, Jr., J. P. Thompson, and D. W. Simon (Andover: Warren P. Draper, 1879), 785. http://hdl.handle.net/2027/nyp.33433081752390

Contributors to scientific publications were divided on the matter. *The American Journal of Microscopy* reported of a conference, "it was generally agreed that the theory of evolution includes the origin of life by natural processes from inorganic matter, and that such an origin is no more improbable than any other tenet of evolution."[92] *The American Naturalist* affirmed that "the essential elements of the problem [i.e. of life] are undoubtedly to be expressed in terms of matter and force without respect to what the nature of that matter may be."[93] It must also be borne in mind that, in this decade, Haeckel was routinely cited by American biologists as an expert on the morphology of marine invertebrates.

Nevertheless, Haeckel's aggressive style was frequently complained of, and used to undermine his credibility. *The American Naturalist* was shocked by the phylogenetic history of this "audacious German author" – the first in the history of biology. Even Darwin had not ventured to describe a general history of life on earth. "Here is a genealogical table of the entire organic world – the work of how many coming centuries we dare not predict – anticipated and set down … with all the assurance of an old-time prophet," it complained.[94] The geologist Alexander Winchell, an early opponent of Darwinian biology, was also taken aback. "The theoretical positions of this author are

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92. "Transactions of Societies," in *The American Journal of Microscopy and Popular Science*, vol. 3 (New York: Industrial Publication Company, 1878), 263. http://hdl.handle.net/2027/hvd.32044081507253

93. John A. Ryder, "The Gemmule vs. the Plastidule as the Ultimate Physical Unit of Living Matter," in *The American Naturalist: An Illustrated Magazine of Natural History, vol. 13*, eds. A. S. Packer, Jr. and Edward D. Cope (Philadelphia: Press of McCalla & Stavely, 1879), 17. http://hdl.handle.net/2027/nyp.33433007813425

94. "Recent Literature," in *The American Naturalist: An Illustrated Magazine of Natural History*, vol. 11, eds. A. S. Packard, G. L. Goodale, and R. H. Ward (Boston: H. O. Houghton and Company, 1877), 167. http://hdl.handle.net/2027/mdp.39015000399504

laid down with an audacious degree of assurance," he wrote, "and he is sometimes as dogmatical as the dogmatists whom he takes so much pains to berate."[95]

Alexander Agassiz, the son of Darwin's great American opponent, Louis Agassiz, and like Haeckel a specialist in the zoology of marine invertebrates, wrote an acid review of Haeckel's *History of Creation* for *The American Journal of Science and Arts*.[96] "A man so skilled in coarse invective," he wrote, "who has risen to such a height of intolerance, is proof against anything so tame as fact or argument." Accordingly, Agassiz declined to engage with the substance of Haeckel's views, noting instead his "absurd claims to omniscience," and that "in the concluding pages, devoted to [Louis] Agassiz and Michelis, all the bitterness of his bigotry and dogmatism are poured forth. … With scientific productions like these," he wrote, "we have no concern."[97]

Agassiz certainly took offense at Haeckel's highly personal and mostly-false abuse of his late father, but he was not the only scientist with a low opinion of Haeckel. In *The American Naturalist*, Charles Sedgewick Minot, who was then finishing his doctorate at Harvard, wrote of Haeckel: "Infallible himself, he has been unsparing in his condemnation of the ignorance and shallowness of his opponents. Proved now to be in

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95. Alexander Winchell, *The Doctrine of Evolution: Its Data, Its Principles, Its Speculations, and Its Theistic Bearings* (New York: Harper & Brothers Publishers, 1874), 41. http://hdl.handle.net/2027/ncs1.ark:/13960/t2p55mk5n

96. "Agassiz, Alexander," in *Complete Dictionary of Scientific Biography, 71-72*, vol. 1 (Detroit: Charles Scribner's Sons, 2008) Gale Virtual Reference Library (accessed March 9, 2017). http://go.galegroup.com/ps/i.do?p=GVRL&sw=w&u=cwru_main&v=2.1&it=r&id=GALE%7CCX2830900052&asid=5d720449ead95890e76e90bcee3dc548.

97. "Botany and Zoology," in *The American Journal of Science and Arts*, vol. 40 – (whole number, vol. 140): January-June, 1876, eds. James A. Dana, B. Silliman, and E. S. Dana (New Haven: Editors, 1876), 74. http://hdl.handle.net/2027/hvd.32044102904091

the wrong, we expect, therefore, justice without mercy from this stern scientific critic, and look forward [to] a thorough castigation of Haeckel by Haeckel."[98]

Haeckel played into the hands of these critics, who wanted his claims for spontaneous generation and simian ancestry ruled out on procedural grounds, by taking insufficient care over the accuracy of his drawings.[99] Alexander Agassiz flatly accused him of inventing his facts in *The American Journal of Science and Arts*. "When he himself, to suit a purpose, deliberately falsifies facts, when he manufactures with names and figures an archetype which never existed," Agassiz wrote, "we are called upon to be grateful that a corner of the veil shrouding creation has been lifted, and so infallible an interpreter of its mysteries, has taken up his abode at Jena." In the same review he accused Haeckel of seeking "the front rank among scientific demagogues."[100] Agassiz may have been nursing a private grievance, but he was not the only person to dismiss Haeckel. In a column titled "Criticisms of Haeckel" the editor of this same journal listed nearly a dozen scientists who had taken issue with Haeckel's arguments, and frequently

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98. *A. S. Packard, G. L. Goodale, and R. H. Ward, eds.,"General Notes." In The American Naturalist: An Illustrated Magazine of Natural History, vol. 11. Boston: H. O. Houghton and Company, 1877, 416. http://hdl.handle.net/2027/mdp.39015000399504* Gale Virtual Reference Library, go.galegroup.com/ps/i.do?p=GVRL&sw=w&u=cwru_main&v=2.1&it=r&id=GALE%7CCX2830902982&asid=c8a90bec2b5005ae6f4132d674f1835a. Accessed 9 Mar. 2017.

99. Haeckel was involved in several controversies over his artistic representations, each of which centered around not so much outright deception, as was and is occasionally alleged, but a carelessness born of haste and enthusiasm, which more cautious researchers, who nonetheless had their own opinions about politics, theology, Darwinian biology, and their own areas of specialization (which Haeckel occasionally intruded on) were quick to pick up on. Because Haeckel invoked his authority as a scientist to make his points on other topics, one strategy available to his opponents was to undermine his credibility as a scientist – which he helped them to do by taking insufficient care over his illustrations, and by paying insufficient attention to detail generally. Nordenskiöld, *History of Biology*, 510; Richards offers a very extensive discussion of this controversy, *Tragic Sense*, 278-312; the most extensive by far, however, is Nick Hopwood's book, *Haeckel's Embryos*, which discusses every aspect of the controversy – from Haeckel's time to the present.

100. "Botany and Zoology," *American Journal of Science and Arts*, vol. 40, 74.

also with his drawings.[101] Quoting the American biologist Charles Sedgewick Minot, he concluded that:

> "I myself have grown up in the faith that among all the qualifications of a naturalist, the only one which cannot be spared is accuracy and an unconditional respect for the truth. At present, also, I still hold the view that the absence of this one qualification tarnishes all others, may they be never so brilliant. Others may, therefore, admire Mr. Haeckel as an active and relentless party leader; in my judgment he has, by his very manner of attack, resigned his right to be reckoned an equal in the circle of serious investigators."[102]

In a later issue of *The American Naturalist*, Minot dismissed Haeckel again, as "inaccurate and untrustworthy to a degree surpassing any other scientific writer I can recall … [this is] also the judgment of competent and distinguished critics, some of whom are even more severe in their condemnation.[103]

For *The Boston Society of Natural History* Haeckel's drawings were "wholly diagrammatic and could not have been drawn from either actual or optical sections."[104] *The American Journal of Microscopy* observed that "Professor Haeckel was so carried away … that he lost, for the time, the power of discrimination between matters of fact

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101. "General Notes," *The American Naturalist*, vol. 11, 368. The scientists he listed were Wilhelm His, a German embryologist who challenged the authenticity of Haeckel's drawings; Theodor Bischoff, a German physiologist who was then nearing the end of a very successful academic career; Francis Balfour, a British morphologist and then a rising star of the profession, who upheld Haeckel's gastrae theory;; Victor Hensen, a German physiologist then nearing the end of his career; the German zoologist Carl Semper; the German zoologist Robby Kossmann; the German zoologist Eduard Oscar Schmidt; the Russian zoologist Elias Mecznikow; the German chemist F. E. Schulze; the young French zoologist Jule Barrois, and the American zoologist Alexander Agassiz.

102. *Ibid*.

103. Charles Sedgwick Minot, "A Sketch of Comparative Embryology," in *The American Naturalist: An Illustrated Magazine of Natural History, vol. 14, eds. A. S. Packard and Edward D. Cope* (Philadelphia: Press of McCalla and Stavely, 1880), 249. http://hdl.handle.net/2027/mdp.39015000399777

104. J. S. Kingsley and H. W. Conn, "Some Observations on the Embryology of the Teleosts," in *Memoirs Read before the Boston Society of Natural History: Being a New Series of the Boston Journal of Natural History, vol. 3* (Boston: Boston Society of Natural History), 198. http://hdl.handle.net/2027/mdp.39015035552648. Nordenskiöld has concurred in their assessment. *History of Biology*, 517.

and hypothesis, and evolved from his own inner consciousness details that are wanting to complete and perfect his theory. … These misrepresentations necessarily justify more than customary precaution in accepting as facts his evidence in other directions, wherever room is left for the slightest reasonable doubt."[105] This was, indeed, a fair comment on Haeckel's entire approach to science, politics, and theology – he never could recognize the distinction. Similarly *The American Journal of Science*, addressing Haeckel's charge that Alexander Agassiz had "willfully neglected" to cite one of T.H. Huxley's monographs in his own work, replied that "Naturalists who willfully ignore or misrepresent the work of their colleagues are fortunately more rare than those who are known to manufacture drawings to suit their pet theories."[106] No one seems to have spoken up for the veracity of Haeckel's drawings, or for his character more generally. It would seem that the combination of all these factors completely ruined his credibility with a sizable share of the American biological research community.

Haeckel's anticlericalism won him few admirers in the United States, though there were some. "In this [Haeckel's *History of Creation*] the protest is strong and pronounced," *The Index* explained, "against the idea of a 'personal' (i.e. a supernatural) Creator or God; yet I find little or nothing really in conflict with the idea of God to which I believe science is tending."[107] Nevertheless, the response to this aspect of Haeckel's

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105. "Transactions of Societies," in *The American Journal of Microscopy and Popular Science*, vol. 5, (New York: Industrial Publication, Co., 1880), 39. http://hdl.handle.net/2027/hvd.32044081507246

106. "Botany and Zoology," in *The American Journal of Science*, vol. 22 (whole number, 122), nos. 127-32, July-December, 1881, eds. James A. Dana, E. S. Dana, and B. Silliman (New Haven, Conn.: J. D. & E. S. Dana, 1881), 161. http://hdl.handle.net/2027/coo.31924093039349

107. F. E. Abbott, "The Boston Sunday Afternoon Lectures, for 1872: The God of Science," in *The Index: A Weekly Paper devoted to Free Religion, vol. 3* (Toledo: Index Association, 1872), 58. http://hdl.handle.net/2027/mdp.39015012321652

project was for the most part hostile. “It gives a painful idea of the intellectual and moral status of a people,” *The North American Review* lamented, grouping Haeckel along with other German materialists,

> when the prospect of destroying the faith of mankind in God is received with cheerful enthusiasm; and it is evident that we have here a reaction against bigotry which is as morbid and unnatural as was the ecclesiastical superstition it attacked. Darwin himself does not share these extreme views of his German followers. ... the Inventor [i.e. God] is there, but much further away than our former science taught.[108]

The author’s hope, it seems, was that Darwin could be brought in but anti-Christian polemics and theology kept out. Later he reminded “even the most bitter of the German atheists” that the fossil record as well as history showed a clear trend toward progress. “What higher evidence” could there be, he asked, “of an intelligent, benevolent, all-wise Creator than a physical and moral creation, based on laws of infinite progress?”[109]

“In the beginning was the nebula, and all things came out of the nebula,” *The New Outlook* wrote with disgust, dismissing the arguments of Haeckel and other writers with atheistic tendencies.[110] Rejecting the views of “Materialists, Epicureans, Haeckelians, and others of that school,” *The New York Observer and Chronicle* protested that, where these saw no difference between animals and humans, “we who believe that Christ died for human beings only, and that they who are in Him became partakers of a divine nature also, see in man a dignity, sanctity and glory excelled only by the angels.”[111] *The*

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108. “Carl Vogt,” in *The North American Review* (1821-1940); Apr 1870; 110, 227; *American Periodicals*, 284.

109. *Ibid*.

110. Taylor Lewis, “Uppermost Topics: An Impersonal God,” in *New Outlook*, vol. 40 (New York: Outlook Publishing Co.), 146. http://hdl.handle.net/2027/coo.31924066372271

111. Prime, “Without a Maker,” 336.

National Quarterly Review dismissed the latest "monograph on the universe" from "the now celebrated Ernst Haeckel."[112]

For all this, the volume of commentary on Haeckel attests to the effect he was having. He was, after all, a lively writer with a firm command of the scientific details – at least so far as the non-specialist public was concerned. Americans wanted to understand Darwinian biology, and in the 1870's, Haeckel's popular exposition had few serious contenders in the English language. The comparatively mild reception of Haeckel's ideas by commentators writing for a broad, non-specialist audience, as contrasted by the firm, and sometimes heated, rejection by clerical and scientific specialists, suggests that his principal influence was not on people who were well-acquainted with the subjects on which he was venturing on, but on the public, which wanted to understand Darwinian biology, but were not in a position to evaluate his broader claims. In the event, he has been vindicated on the questions of spontaneous generation, simian ancestry, and also on the practice of drawing phylogenetic trees, while his broader project of setting up a monistic theology has not been successful. In terms of his broader influence, he has probably been most successful at provoking hostility between biologists and ministers, as he intended.[113]

Conclusion

112. Sears, "Cell-Theory," 325.

113. Richards attributes the "culture wars" over science and religion to the action of his young wife's death, perhaps of a burst appendix, on his "high-strung" personality. *Tragic Sense*, 15-16.

Haeckel's anti-Christian rhetoric was a major obstacle to the acceptance of his larger theological project – by his own admission the principal motivation for his efforts to communicate Darwinian biology. His violent reaction to clerical privilege is surely understandable in the context of his native Germany, but from the vantage point of American readers, for whom religious observance was voluntary, it often came across as unreasonable.

The conflict over Darwinian biology which substantially informs modern perspectives was a product, not of the 1870's, but of the 1920's. In it, Haeckel was a posthumous participant, for Protestant ministers and theologians, long-abused by the German naturalist, saw in the First "World War" (a term coined by Haeckel), and the atrocities committed by advancing German armies, a vindication of earlier warnings, that "Atheism plus Darwinism equals Brutalism: the beastliest philosophy to ever nightmare the human soul."[114] In this respect, they were fortunate in their adversary, for, as we have seen, Haeckel's aggression, speculative tendencies, and less-than-careful handling of scientific evidence, all left him (and, by association, Darwin) exposed on a number of fronts. It was on this basis that William Jennings Bryan and his fellow anti-evolution crusaders tried to pass laws forbidding its teaching in public schools.[115] After the second war, the scientific racism and eugenics policies of the Third Reich, which bore a close resemblance to views Haeckel expressed in his own lifetime, made him an even more

114. "Quarterly Book Table," *Methodist Quarterly Review*, 102.

115. Edward J. Larson, *Summer for the Gods: The Scopes Trial and America's Continuing Debate Over Science and Religion* (New York: Basic Books, 2006), 34-40.

attractive target. As Robert Richards has lamented, the theologians and ministers have been well-and-truly revenged on their German adversary.[116]

Yet the conflict mode, with science standing on one side and religion on the other, cannot account for Ernst Haeckel's career, for he was unwilling to admit that he was any less religious than his Christian adversaries, and many of them were not inclined to follow Charles Hodge in taking a firm line against Darwinian biology.[117] When the polemics of this situation are set aside, it can be seen that the issue between Haeckel and his Protestant and Catholic opponents was less whether science or religion should be accepted, but which should incorporate and subsume the other. Put differently, should there be an evolutionary understanding of faith, or a faithful understanding of evolution? Commentators such as S. J. Barrow, and the anonymous contributor to the *Methodist Quarterly*, wanted to fit Darwinian biology within a Christian-theological framework. Haeckel wanted to fit an entirely new theology within a Darwinian-biological framework. Both had a legitimate interest in science *and* in religion. American commentators of the 1870's often believed that Darwinian biology could, and should, be fit within a Protestant-theological context. From the point of view of American commentators in the 1870's, Haeckel's attacks on their prior theological commitments were a barrier to the acceptance of both his ideas, and Darwin's.

Haeckel's project was hampered with American audiences in another respect as well. Aside from a general commitment to science and progress, it offered little in the

116. Richards, *Tragic Sense of Life*, 7.

117. Hawkins, *Social Darwinism*, 144.

118. Haeckel, *Natural History*, vol. 1, 17.

way of a positive vision. Nature was, in Haeckel's view, a scene of brutal and incessant slaughter. "If we contemplate the common life and the mutual relations between plants and animals (man included)," he had written,

> we shall find everywhere, and at all times, the very opposite of that kindly and peaceful social life which the goodness of the Creator ought to have prepared for his creatures —we shall rather find everywhere a pitiless, most embittered *Struggle of All against All*. [italics in the original] Nowhere in nature, no matter wherever we turn our eyes, does that idyllic peace, celebrated by the poets, exist; we find everywhere a struggle and a striving to annihilate neighbors and competitors. Passion and selfishness —conscious or unconscious —is everywhere the motive force of life.[118]

Haeckel insisted on this grim view of things in numerous publications, and throughout his long life. In his view, nature (which is to say, God, in his system of theology) did not care for human beings, but created them with mindless fecundity, scattered them through time and space for no particular reason, and disposed of them with equally-pointless savagery.

What redeemed nature in Haeckel's system of theology was its rational comprehensibility, the aesthetic pleasure one could derive from participating in it, and the "law of progress" which evolution mandated. The first two of these virtues might have served the needs of Haeckel, the scientist-artist, tolerably well, but for the non-scientist, non-artist public, it was thin gruel. Progress was reassuring, of course, but stripped of the heroic adjectives which Haeckel made such liberal use of, and which could produce a certain transient exhilaration in a casual reader but hardly profundity of thought in a careful one, what it amounted to was the assertion that the reader's organic structure and that of the society in which they lived was marvelously complex (which was true, but hardly revelatory), and that those of their distant descendants would likely be even more

119. Haeckel, *Natural History*, vol. 1, 17.

so (which may or may not have been true, but was at any rate of no benefit in the present.) Thus Haeckel's "law of progress" offered nothing in particular to the reader in their own life and struggles, apart from a general sense that things were "moving in the right direction."

But this was a message that Haeckel's readers could get from any number of sources (indeed, it was hard for an educated Victorian to *escape* it), so again it was of no special benefit to Haeckel's project. Further, it is difficult to see how progress, conceived as the accumulation of complexity in a population of individual organisms, each one of which was destined to live pointlessly and die painfully, actually *could* redeem nature. At no point did the cycle of struggling and suffering reach its final culmination, for there was none. Things simply went on getting more and more "perfected", presumably *ad infinitum*, leaving each new creation to marvel at the beauty and rationality of the whole arrangement before the beautiful and rational hammer fell and snuffed it out forever.[119] The pleasures of rational and aesthetic comprehension, though no doubt real, do after all have their limits, and it may be reasonably doubted whether the redemption of a brief and painful life lies within them.

Despite his brave talk, it seems evident that Haeckel did not derive much solace from his own creed. He never recovered from the death of his young wife, always wrote with a bitter and accusatory edge, frequently contemplated suicide, and recommended it to others when their problems seemed too much to bear. He was, to put it simply, unhappy, and inclined to spread the mood – a circumstance which did not prevent him from setting himself up as the bearer of the final revelation, effectual for the moral and

120. Haeckel, *Natural History*, 174.

spiritual edification of humankind. At any rate, if his preferred consolation for the misfortunes of life were of such doubtful benefit to him personally, they can hardly have benefited many other people.

"A man may read in the book of Nature whatever he pleases, just as in the Bible," Karl Vogt wrote for *The Popular Science Monthly*.[120] In his "monographs on the universe," Haeckel read Darwinian biology, grafted onto his own romantic-idealistic monism, and his own theological-political aspirations for a German Empire guided and blessed by his evolutionary monism, into that "book of nature." His American readers were reading different things into the "book of nature," as well as into their Bibles. Transplanted from its native soil, the "plan," so to speak, of Haeckel's ideas did not thrive in new climes. Darwinian biology, however, was another matter. They thanked him for his explanation of it, wondered nervously whether his more extreme conclusions might have something to them, and moved on.

121. Vogt, "Pope and anti-Pope," in *The Popular Science Monthly*, 412.

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