ABSTRACT

Title of thesis: "SCIENTIFIC TRUTH, RIGHTLY UNDERSTOOD, IS RELIGIOUS TRUTH": THE LIFE AND WORKS OF REVEREND EDWARD HITCHCOCK, 1793-1864

Ariel Jacob Segal, Master of Arts, 2005

Thesis directed by: Professor James B. Gilbert
Department of History

Reverend Edward Hitchcock (1793-1864) was an important figure in 19th century American science. He contributed to the fields of geology and paleontology, and was the founder of paleoichnology. The overriding passion of Hitchcock's life was the reconciliation of science with evangelical Protestant Christianity. For most of his career, he located all of geological time in a "gap" between the first two verses of Genesis, but later tended to view the Creation days themselves as symbolic. Hitchcock also dealt intensively with the scientific understanding of Noah's flood. At first, he advocated a Deluge covering the entire planet. Subsequently, he held that the Deluge only affected the portion of the planet inhabited by humanity during the time of Noah. Hitchcock used evidence from science to support both natural and revealed religion. He combined this synthesizing with an increasingly extravagant romanticism, and confidently looked forward to continuing his scientific investigations in Heaven.

"SCIENTIFIC TRUTH, RIGHTLY UNDERSTOOD, IS RELIGIOUS TRUTH": THE LIFE AND WORKS OF REVEREND EDWARD HITCHCOCK, 1793-1864

by

Ariel Jacob Segal

Thesis submitted to the Faculty of the Graduate School of the
University of Maryland, College Park in partial fulfillment
of the requirements for the degree of
Master of Arts
2005

Advisory Committee:

Professor James B. Gilbert, Chair
Professor Stephen G. Brush
Dr. Thomas R. Holtz, Jr.

ACKNOWLEDGMENTS

First of all, I would like to thank my thesis adviser, Dr. James Gilbert. He was of invaluable assistance in providing me with information on the social and cultural context of Hitchcock's 19th century New England, and helped guide the thesis through its many drafts.

In addition, I am grateful to the other members of my thesis committee, Dr. Stephen G. Brush and Dr. Thomas R. Holtz, Jr. Dr. Brush helped me clarify the meaning of Hitchcock's romanticism and the nature of geological time, and Dr. Holtz provided useful information on the use of geological and paleontological terminology in Hitchcock's time and today.

I was greatly assisted in understanding Hitchcock's religious development by manuscripts from the Edward and Orra White Hitchcock collection at Amherst College. I thank Head of Amherst College Archives and Special Collections Daria D'Arienzo and Curator of Special Collections John Lancaster for permission to quote from the manuscripts.

Closer to home, I benefited from the ability to examine original copies of Hitchcock's geological surveys at the Natural History Library, Smithsonian Institution Libraries. I would like to thank the NHL staff, Martha Rosen, Richard Greene, and David Steere, for access to the surveys and other helpful works.

Lastly, I would like to thank Hashem for allowing me to reach this day.

TABLE OF CONTENTS

Acknowledgments....ii

List of Illustrations....iv

Chapter 1: Introduction: Edward Hitchcock, Man of Science, Man of God....1
Literature on Hitchcock....11

Chapter 2: Hitchcock's Life and Intellectual Development: Religion, Rationality, and Romanticism....32
Early life and thought; Unitarianism (1793-1813)....32
Crisis, Conversion, Controversy, and Ministry (1814-1825)....39
Professorship, Temperance Work, Geological Surveys, Ichnology, and Scientific Professionalization (1825-1844)....58
Amherst Presidency and Excursions (1845-1854)....87
Ichnological Summation, Last Years and Legacy (1855-1864)....102

Chapter 3: Hitchcock's Views on Science and Religion from the Conway Ministry to the Moses Stuart Controversy (1823-1836)....112
Earliest Thoughts and Cuvierian View of the Flood (1820-1823)....115
What God hath joined together, let no man put asunder" : The Two Reviews of Buckland's *Reliquiae Diluvianae* (1823-1824)....135
"The Digging of Rocks and the Digging of Hebrew Roots": Philology and Geology in Combat (1835-1836)....144

Chapter 4: The Culmination of Hitchcock's Science-Religion Synthesis in *The Religion of Geology* and response to "Creation by Law" [Evolution] (1837-1863)....158
Hitchcock's Mature Thought Emerges; A Partial Flood and *The Religion of Geology* (1837-1851)....158
General Thoughts, Response to Critics and to Darwin (1852-1863)....170

Bibliography....180

ILLUSTRATIONS

Figure 1. Hitchcock's proportional drawing of fossil footprints. From *American Journal of Science* 29, no. 2 (January 1836): 402. 76

Figure 2. Hitchcock's fossil footprint collection in the Appleton Cabinet. From Hitchcock, *Ichnology of New England*, Plate iv. 111

Chapter 1: Introduction: Edward Hitchcock, Man of Science, Man of God

"Edward Hitchcock…a man who was constantly in fear of death, who worried about his health and tried each new fad in diet, yet who lived to be seventy-one, after accomplishing the work of half a dozen ordinary teachers and writers."
"One feels like saying of President Hitchcock, as Sergius did of Bluntschli in Shaw's comedy, 'What a man! What a man!' " [1]

Reverend Edward Hitchcock was an important figure in 19th century American science. While he is now largely forgotten, he was well known to the public in his day, and even influenced the literary culture of the time. (A revival of interest in his work seems to have occurred in the past decade.) He contributed signficant studies to the fields of geology and paleontology, conducting the first comprehensive geological survey of a U.S. state at public expense. He also advanced the discipline of paleoichnology, the study of fossil footprints, through his extensive study of "bird" [actually dinosaur] tracks in New England. References in novels of the time to fossil footprints can be traced directly to the influence of Hitchcock's ichnological studies.[2] He wrote the first American-authored college-level geology textbook, which went through more than 30 editions.[3] In an organizational context, Hitchcock was deeply involved in the formation of the

---

[1] Claude Moore Fuess, *Amherst: The Story of a New England College* (Boston: Little, Brown, and Company, 1935), 103, 129. Subsequent references to sources will be given in short form. See the Bibliography for full citations in 3 parts: A)Manuscripts; B)Primary published sources; C)Secondary published sources.

[2] For Hitchcock's influence on literature, especially Melville and Thoreau, see Dennis R. Dean, "Hitchcock's Dinosaur Tracks," *American Quarterly* 21, iss. 3 (Autumn 1969), 639-44, esp. 642-3.

[3] There was one earlier geology textbook written in the U.S., although it was "an Americanized edition of a British text." Paul Theerman, "Hitchcock, Edward," in *American National Biography*.

Association of American Geologists and Naturalists. This Association was a predecessor of the American Association for the Advancement of Science.

In addition to his contributions to geology and the formation of scientific associations, Hitchcock also actively participated in social reform movements that were common in mid-19th century New England. He was a fierce advocate of temperance-the anti-alcohol movement-believing that no one on earth should drink. He was a noted advocate of women's education, supporting the establishment of Mt. Holyoke College.

Hitchcock was a professor of chemistry and natural history at Amherst College from 1825 until 1845, when he changed "his title to professor of natural theology and geology."[4] In 1844, he became president of the Amherst College, in which capacity he continued until 1854. During his tenure, he managed to rescue the college from debt and put it back on a solid financial footing. Hitchcock did not have a formal collegiate education, although he received several honorary degrees and audited some science and theology courses at Yale during the years 1819-1820. Hitchcock was a transitional figure between the era of "first-rate amateurs" (those scholars who excelled in many fields without formal university training prevalent in the early 1800s) and the increasing professionalization of academia in the latter half of the century. Upon resigning the office of the Presidency, he continued his scientific research at Amherst in his capacity of professor of natural theology and geology until his resignation from that position due to ill health in 1863.

Over and above these achievements and vocations, the central focus in Hitchcock's work life was an attempt to reconcile science and religion, particularly with

[4] Ibid, loc. cit.

respect to two main areas: 1)The account of creation in Genesis and its relationship to geological time and prehistoric animals; and 2)The Flood of Noah and its relationship to the geological layer known first as "diluvium," later termed "drift," and now identified as Pleistocene Epoch deposits (belonging approximately to the period of the most recent Ice Age).

For most of his career, Hitchcock claimed that there had indeed been a great span of time, possibly hundreds of thousands of years, or as much as 10 million, in his estimate, by 1851, between the creation of the world and the creation of Adam. Rather than interpret the creation Days as epochs, which he felt did violence to the plain sense of the text of Genesis, he held that all of geological time took place between the first and second verses of Genesis. The initial creation of the universe occurred "at a certain point of time in past eternity, which is not chronologically fixed…if [the first verse of Genesis can] be understood as an announcement of the act of creation at some indefinite point in past duration, then a period may have intervened between that first creative act and the subsequent six days' work."[5] After the passing of all the epochs described by geology, "the earth was [again] without form and void," and the six days (literally) of Creation took place. Hitchcock was also willing to admit that other views, such as Day-epoch/age, could be legitimate Christian views.

Hitchcock became more amenable to a day/age view of Creation in his late works, especially the new chapter in the second edition of *The Religion of Geology* (1859). Hitchcock was increasingly inclined to view the Genesis days as nonliteral in some sense: "[T]he Bible should not be held responsible for the chronology, but only for

[5] Hitchcock, *The Religion of Geology and its Connected Sciences* (Boston: Phillips, Sampson, and Company, 1852; reprint, Hicksville: Regina Press, 1975), 39.

the general character of the different creations, the model of which Moses had before him in the existing races…The days are symbolical…The six pictures on the Mosaic tablet were intended to embrace the universe, having existing nature on the foreground, as it meets the eye of the common observer…"[6]

The diluvium/drift/Pleistocene deposit is a stratum of various erratic boulders and gravel moraines prevalent in New England and Northern Europe. Unusual striations on surrounding rocks are also classified as belonging to this layer. All of these structures were deposited by forces greater than the natural flow of rivers, erosion and deposition. For instance, the boulders are often quite large and found on top of hills, not composed of the same type of rock as the surrounding area. Some great force must have transported these rocks to their present location. While present science attributes these phenomena to the remains of Ice Age glaciers, Hitchcock initially had other ideas.

In the 1820s, Hitchcock held that this "diluvium" had been produced by Noah's flood, which seemed to have been a massive current flowing down from the Northern hemisphere over the whole world. Thus, he held that explicit evidence of Noah's flood was definitely provided by geology in the form of the diluvium. Later, in the 1830s, he believed that diluvium had been deposited by a pre-Adamic "geological deluge." By the 1840s, he was investigating various new hypotheses suggesting icebergs and/or glaciers as depositing agents for what he was now calling "drift." By 1860, his final (albeit tentative) conclusion was that deluge-borne icebergs had played the most important role in depositing the drift.

---

[6] Hitchcock, *The Religion of Geology and its Connected Sciences…With an Additional Lecture, Giving a Summary of the Author's Present Views of the Whole Subject*, 2nd ed. (London: James Blackwood & Co., 1859), 330-331.

In investigating Hitchcock's attitude towards religion and science, it is vitally important to distinguish it from both modern secularism and the anti-intellectualism attributed (perhaps erroneously) to modern Fundamentalism. He simultaneously conducted passionate revivals and rigorous empirical investigations of fossils and geological formations. Hitchcock lived in an intellectual mileu that stressed "a positive coordination between Protestant religion and that heavily empiricist, factual style in scientific inquiry of which Bacon had become the crucial symbol."[7] Scholarship in the history of science and religion over the past half-century has rejected the late 19th century "warfare" paradigm of John Draper and Andrew Dickson White. In antebellum America, science and religion were generally considered to be harmonious, so that the emergence of conflict between the two fields over Darwinian evolution "represents not a sudden focus of religious concern upon science, but rather a nasty turn in a preexisting and far more congenial pattern of interplay and skirmish. To neglect or minimize the scientific interests of many antebellum Protestant thinkers is to obscure this important prehistory."[8] Bozeman does not address Hitchcock in depth, referring to him briefly five times in his book, since he is focused on Presbyterian responses to science and religion (Hitchcock was a Congregationalist), However, his overall points clearly apply to Hitchcock's thinking.

Hitchcock was working from a different set of assumptions than current (2005) thinkers have, whether secular or Christian. Currently, "Creation scientists" often bruit

---

[7] Theodore Dwight Bozeman, *Protestants in an Age of Science: The Baconian Ideal and Antebellum American Religious Thought* (Chapel Hill: University of North Carolina Press, 1977), xiv.

[8] Ibid., loc.cit.

about their reliance on "absolute facts." This seems to be a legacy of the antebellum Baconian attitude towards science. Contemporary "young-earth" creationists are unwilling to accept the notion of an ancient (> ≈ 10000 year) universe, no matter what evidence appears to support it. Some have indeed changed their views of the precise mechanisms of creation and the Flood to accommodate various geological phenomena. However, those who go as far as asserting an immensely ancient earth are usually considered traitors and apostates by other "young-earthers." In addition, advocates of Intelligent Design are abused by young-earth creationists not only for accepting an old earth but also the Big Bang and evolution in some form.[9]

Hitchcock and other devout, theologically conservative Christian geologists of his day (such as his friend Benjamin Silliman) were willing to change their views on the nature of the Creation in Genesis and of the Flood based on their investigations of geology. This did not cause any change of their underlying religious convictions or lead to social ostracism, though they had their share of disputes with literalists. Hence, one must try to understand Hitchcock's convictions on science and religion in light of the intellectual scene in which he preached and researched.

Hitchcock divided his attitude towards science and religion into two components: philosophical and practical. The philosophical component showed up in his sermons and lectures on natural theology, preached consistently throughout his career from 1823 in his church at Conway, all the way through his professorship and presidency at Amherst, in

[9] For an example of this abuse toward old-earth defectors, see former young-earth creationist Glenn R. Morton's account of his transition to an old-earth/theistic evolution perspective, "Why I left Young-earth Creationism,"; accessed 28 November 2005; available from http://home.entouch.net/dmd/gstory.htm.

addition to other public lectures and lyceums. The practical component showed up in his scientific papers. The philosophical component consisted of a view that science and religion ultimately constituted a unity. Hitchcock saw moral messages inherent in Nature, and gave sermons in which he illustrated these messages. For example, different types of mineral crystals were held to be useful metaphors for varying moral and Christian characters (i.e. transparent/honest-->opaque/corrupt). Phenomena of the changing seasons he held to be analogous to religious events such as the resurrection of Jesus. He felt that ultimately, when the postapocalyptic world was renewed for the elect, scientific truth would merge with religious truth. But even in the current fallen state of the world, science, understood properly, was a form of religious truth. "In his teaching, writing, and preaching" Michele Aldrich writes, "he conceived a transcendental vision of God more comprehensible from a fusion of theological and natural studies than from their division into separate compartments of knowledge."[10]

Hitchcock's devotion to this fusion led to the conviction that scientific discoveries were vital to a proper understanding of Genesis and could aid in the exegesis of its text. Theologically controversial conclusions, such as that of a vastly ancient earth, had to be accommodated to orthodox Protestantism. With regard to biblical literalists who claimed that all rock layers and fossils were created simultaneously, he replied:

> [It is] not that [rigorous Christian geologists like himself] doubt the power of God to produce such effects [instantaneous creation of strata], but they deny the probability that He has exerted it in this manner…If rocks are an exception to the rest of nature,--that is, if they are the effect of miraculous agency--there is no proof of it; and to admit without proof is to destroy all grounds of analogical reasoning in natural operations; in other words, it is

[10] Michele Aldrich, "Hitchcock, Edward," in *Dictionary of Scientific Biography* 6 (1972): 438.

> to remove the entire basis of reasoning in physical science. Every reasonable man, therefore, who has examined rocks, will admit that they have undergone important changes since their initial formation.[11]

Even so, Hitchcock was a life-long opponent of evolutionary theories, which were collectively known then as the hypotheses of "creation by law," but even in his arguments against it, religious feeling was not the ultimate determinant of his opposition. After describing various objectionable religious implications of adopting Darwinism, he stated that "[T]he real question is, not whether these hypotheses accord with our religious views, but whether they are true."[12] He cited long lists of anti- evolutionary evidence provided by various mainstream American and European scientists, and indicated that it was this evidence which decided the issue for him.

In Hitchcock's practical scientific work, facts were the ultimate determinant of scientific problems, not religious doctrine. Religious references in his scientific papers and geological surveys tend to be rarer and more toned down (referring to God rather than Christ) than in his sermons, as one would expect. However, even under these restrictions, he saw the ultimate goal of scientific work as the support of religion. For instance, in the above-mentioned lecture on minerals representing different moral characters, he noted that there was no *real* connection between mineralogy and Christian character. The opacity of a mineral could figuratively represent a corrupt character, but an opaque mineral is not corrupt. In a slightly defensive vein, he acknowledged that this method of literal-figurative "exhibiting of religious truth has no little quaintness about it.

---

[11] Hitchcock, *Religion of Geology*, 20.

[12] Hitchcock, "The Law of Nature's Constancy Subordinate to the Higher Law of Change," *Bibliotheca Sacra and Biblical Repository* 20, no. 79 (July 1863), 524.

But if it convey no error, and makes the truth more impressive, perhaps I may be pardoned for employing it; since the highest use to which we can put science is to make it subservient to religion."[13]

Hitchcock stated some of his basic principles with regard to the relation between religion and science in a systematic way in an 1852 essay, "Mutual Relations Between the Philosopher and Theologian." On the one hand, he said that religion should not forcibly prevent scientists from the "freest and fullest liberty of investigation."[14] In addition, all scientific truths were not to be found in the literal text of the Bible, as 18th century physico-theologists had held. "The language of science and of Scripture, as well as of popular religious literature, requires different, or at least modified, principles of interpretation."[15] On the other hand, citing the technological and military prowess of revolutionary France (which he regarded as a godless tyranny), he noted that "[t]he cultivation of science, without the restraints of religion, often proves very disastrous…History shows impressively the danger of exalting philosophy over revelation."[16] In sum, he strongly counseled religious Christians from dogmatically denouncing seemingly controversial discoveries without having thoroughly and accurately learned about them first.

---

[13] Hitchcock, "Mineralogical Illustrations of Character," in *Religious Truth, Illustrated from Science, in Addresses and Sermons On Special Occasions*(Boston: Phillips, Sampson and Co., 1857), 286.

[14] "Mutual Relations Between the Philosopher and Theologian," 1852, reprinted in *Religious Truth, Illustrated from Science*, 93.

[15] Ibid., loc. cit.

[16] Ibid.

Even with Hitchcock's methodological restraint on questions of proper Biblical interpretation, and his insistence on facts determining scientific truth, his ultimate eschatological vision of the purpose of science and geology recurs quite often throughout his religious works. For example:

> I know, indeed, that many imagine geology to be unfavorable to piety, and tending to scepticism. I can say only that it has not been so with me, but the reverse; strengthening my faith in the great principles of the gospel, and enabling me to see something of the Cross in Nature and something of Nature in the Cross…what a solace will you find in a sanctified, Christian love of nature!…though the first and the sweetest song of heaven is, *Worthy is the Lamb that was slain*, yet the second sounds from the same golden harps, with a rapture scarcely less, GREAT AND MARVELLOUS ARE THY WORKS, LORD GOD, ALMIGHTY![17]

Indeed, Hitchcock believed that geology was a great aid to religious piety, in that it helped refute ideas of the world's eternity-through evidence that the planet had once been lifeless and molten. Geology also demonstrated that the world was fallen and would eventually be purged and renewed through the apocalyptic Final Conflagration. Geology, he believed, helped demonstrate evidence of God's special providential intervention in nature, and even provided indications leading to revealed religion. Some current evangelical intellectuals, such as Rodney Lee Stiling and Davis A. Young, have shown intense interest in Hitchcock's work, both geological and theological, as a means of combating literalist creationists. This factor, combined with the reevaluation of Hitchcock's footprint classifications by paleontologists, shows that Hitchcock's work is still relevant to contemporary societal issues and scientific problems.[18]

---

[17] Hitchcock,*Reminiscences of Amherst College*, *Historical, Scientific, Biographical and Autobiographical: Also, of Other and Wider Life Experiences* (Northampton, Mass.: Bridgman & Childs, 1863), 405-407, capitals Hitchcock's .

[18] For current evangelical interest in Hitchcock, see below, 23-26; for paleontological research, see especially 27-28.

Literature on Hitchcock

Most of the literature on Hitchcock for about 75 years after his death consisted of relatively dry summaries of his career and life achievements. These articles sometimes added a small amount of "Whiggish" editorializing to defuse the issue of Hitchcock's antievolutionism. For instance, an anonymous biographical sketch from 1895 in *Popular Science Monthly*, after listing a summary of Hitchcock's scientific accomplishments, noted that "While not accepting any development hypothesis, Prof. Hitchcock took pains to insist that its adoption would not be at variance with any fundamental principle of theology. During his lifetime the doctrine of creation was the prevalent fashion of thought, just as now everybody is an evolutionist, and as in the Mesozoic age every vertebrate animal assumed some reptilian feature."[19] The last phrase of this comment is representative of a popular neo-Lamarckian non-Darwinian conception of evolution, in which all organisms pass through similar stages of development in their ascent through a scale of nature.[20] It also suggested that Hitchcock was typical of his times.

Hitchcock's son, the geologist and minister Charles Henry Hitchcock, in a sketch of his father for the journal *The American Geologist*, explicitly excluded Hitchcock's theological and administrative work from his article, focusing only on Hitchcock's geological work. He claimed that if his father had lived two more years, "he would have probably adopted the glacial theory, as by that time it had become obvious that the

---

[19] "Sketch of Edward Hitchcock," *Popular Science Monthly* 47, no. 6 (September 1895): 695-696.

[20] Dr. Thomas R. Holtz, Jr., personal communication, July 19, 2005.

immensity of the glacial area and the ascent of the ice thousands of feet were no bar to its adoption; and he would then have been the first to see a terminal moraine in the hillocks of cape Cod and Long island [sic]."[21] Perhaps the same sort of presentism can be seen here, e.g. "If Hitchcock had only lived a few years more, he would surely have accepted evolution/bipedal dinosaurs/a continental glacier." Later scholarship would attempt to consider Hitchcock in his own sociocultural milieu, without such efforts to explain his backwardness.

Through the first half of the twentieth century, little research was done on Hitchcock. George Merrill's 1924 *The First One Hundred Years of American Geology* listed Hitchcock's achievements scattered over the book in different sections devoted to ichnology and geological surveys. Claude Moore Fuess's 1935 history of Amherst College was full of admiration for Hitchcock's financial salvation of Amherst and his geological work. However, he clearly looked down at the revivalism Hitchcock advocated, claiming that "The psychology of these strange outbursts [revivals] is even now not fully understood…"[22] According to Fuess, Hitchcock, due to his hypochondria, "would be regarded by some physicians as a proper subject for psycho-analysis."[23]

Hitchcock's work on science and religion received substantial treatment in 1941, with Conrad Wright's article "The Religion of Geology" in *The New England Quarterly*. Wright was again quite Whiggish in his approach, which traced the Genesis-geology

---

[21] Charles Henry Hitchcock, "Edward Hitchcock," *American Geologist* 16, no. 3 (September 1895): 137.

[22] Fuess, *Amherst*, 138.

[23] Ibid., 128.

reconciliation attempts of Hitchcock, Benjamin Silliman, and James Dwight Dana. Ironically, Wright exhibited his presentism by praising the Biblical literalist approach of Hitchcock's philologist opponent Moses Stuart. Wright's contention is that Stuart "was closer to the truth than the advanced thinkers of the time when he said, 'If they please let it be a question, whether Moses has taught wrongly or rightly; but it never can be a question with philologists whether modern science is to be the final judge of what an ancient text means."[24] According to Wright, then, Hitchcock, Silliman, and Dana were *wrong* in trying to interpret Genesis in light of modern science, since the text was composed in an era that lacked that knowledge. Wright claimed that the reconciliation schemes of Hitchcock and his allies were probably accepted by most of the populace of New England on some level. Developments in evolutionary theory destroyed this synthesis, he concluded. "[A] new assumption…brought about the collapse of the beautiful structure Hitchcock had labored so hard to erect. It was Darwin…who finally removed man from the center of the universe, and thereby crumbled the religion of geology to dust."[25]

After World War II, thanks largely to the efforts of Harvard professor George Sarton, the history of science as an academic discipline became more professionalized. During the 1950s, some articles and books briefly touched on Hitchcock in a more contextualist and less Whiggish fashion. Francis C. Haber's *The Age of the World: Moses to Darwin* (1959) traced attitudes toward Earth's age from antiquity until 1865. Haber

---

[24] Conrad Wright, "The Religion of Geology," *The New England Quarterly* 14, no. 2 (June 1941): 344-345.

[25] Ibid., 358.

chose 1865 as a stopping point because he claimed that the notion of an extremely ancient earth had been fully accepted by scientists by then. Haber viewed the Christian view of time ("Mosaic history") as linear and leading from Genesis to the Apocalypse as having been somewhat useful in the history of geology. This linear view, the "constant pressure of the Christian view of historical process on views of natural process helped to preserve…[an] outlook in terms of concrete, actualistic time."[26] Actualistic time means time in which the same types of natural processes (erosion, deposition) have always operated. Mosaic history prevented the dominance of a view that the world was eternal (and that hence the age of the earth was not worth investigating). Therefore, Mosaic history "held the potential in readiness until the geologists discovered the real chronology of the earth…and could substitute a scientific for a theological series of epochs…Mosaic history, though it had ended as a crotchety scold for natural science, had had its fertile period."[27]

Accordingly, Haber took a somewhat sympathetic view of Hitchcock's science-religion reconciliations. He provided a 4 page summary of Hitchcock's views as expressed in *The Religion of Geology*, including his ideas on geology as the most recent part of God's systematic plan to gradually increase humans' knowledge of Him. In general, Haber viewed Hitchcock as useful in disseminating a sense of deep time to the public: "Coming from so respected a member in the ranks of devout Christians, the arguments of Hitchcock could not have failed to carry conviction to the minds of many hesitant Americans that the time had come for a revamping of their outlook on the

[26] Francis C. Haber, *The Age of the World: Moses to Darwin* (Baltimore: Johns Hopkins Press, 1959), 190-191.

[27] Ibid., 191.

temporal size of the universe."[28] Haber had not fully gotten away from a Whiggish view of Hitchcock.

Another brief consideration of Hitchcock appeared in Milton Millhauser's 1954 appraisal of the Scriptural Geologists, or figures who insisted in a literal reading of the Genesis and Flood narratives during the early mid-1800s. Millhauser objected to the summary dismissal of such literalists as "absurd" by earlier historians of science. "[Scriptural geology deserves] a less tendentious treatment…At the very least, it establishes the character of a fairly widespread lay interest in the new science, and thus suggests the animus and intellectual preparation with which the public and its leaders…would approach the work of a LYELL or a DARWIN; Even yesterday's popular science can have its relevance to the life of the mind."[29] The Scriptural Geologists, Millhauser explained, were not necessarily ignorant of geology. The controversy over how to deal with Genesis and geology persisted over the first half of the 1800s, "engag[ing] the abilities of genuinely competent men" until the publication of Darwin's *Origin* after which at least the literalists were "no longer taken seriously."[30] Millhauser explored the rise of the "gap" theory and its rival the "day-age" theory in their various permutations, and traced the Scriptural Geologists' opposition to both. Hitchcock appears in passing in Millhauser's article, as an advocate of reconciliation in general and the gap theory in particular, and opposed to the Scriptural Geologists.

---

[28] Ibid., 258.

[29] Milton Millhauser, "The Scriptural Geologists: An Episode in the History of Opinions," *Osiris 11* (1954): 65-66.

[30] Ibid., 68.

Several works in the 1960s touched briefly on Hitchcock's influence on science-religion debates, dinosaur paleontology, and popular culture. John H. Giltner, a professor of church history, wrote an article in 1966 dealing with the "Genesis and Geology" controversy, when Moses Stuart debated with Hitchcock and Hitchcock's ally Silliman. Giltner used Charles Coulston Gillispie's terminology from his 1951 *Genesis and Geology* to describe the conflict as being " 'one of religion *in* science' rather than 'one of religion *versus* science.'"[31] By this, Gillispie and Giltner both meant that the geologists were, on the whole, also devout Christians and committed to the Bible as a divinely inspired text. Thus, the conflict was on how to interpret the Bible with regard to geology, rather than whether or not to reject the Bible in light of geology.

The central thrust of Giltner's article was to describe Stuart's view, which is "that the meaning of the words in Genesis simply cannot be determined by reading in the theories of modern science. But more irksome was the fact that the geologists were now purporting to speak with authority on philology, a subject which was plainly out of their field."[32] Giltner approvingly quoted Conrad Wright's claim that Stuart was closer to the truth than Hitchcock and Silliman. He concluded that it was Stuart's view "which led most directly to an understanding of the positive roles of both science and religion in their diverse but not mutually exclusive attempts to explain the origin of the universe."[33]

---

[31] John H. Giltner, "Genesis and Geology: The Stuart-Silliman-Hitchcock Debate," *Journal of Religious Thought* 23, no. 1 (1966-1967): 4.

[32] Ibid., 9-10.

[33] Ibid., 13.

The distinguished paleontologist Edwin Colbert summarized Hitchcock's ichnological discoveries in his 1968 *Men and Dinosaurs: The Search in Field and Laboratory*. He praised Hitchcock's discoveries, and noted that although the footprints are now known to be those of dinosaurs, "our knowledge, based upon a greatly augmented fossil record, was still not available to Hitchcock. Fossil footprints so closely analogous to the tracks of modern birds must represent modern birds; such was the logic of his argument, which at the time was beyond reproof."[34]

Dennis R. Dean also explored Hitchcock's footprint discoveries in 1969, but his emphasis was on these discoveries' impact on American literary culture. He found references to fossil bird footprints in the poems of Henry Wadsworth Longfellow and in *Moby-Dick*.[35] Dean claimed that Hitchcock's *Religion of Geology* "echoes… Transcendentalism generally."[36] This may be erroneous, as the work appears to be much more in line with Calvinist-influenced Baconianism. There are, to be sure, romantic flights of fancy in the work, but Hitchcock belongs to a markedly different intellectual tradition. Dean found Hitchcock interesting because he seemed to mark a transition in geology from first-rate amateurs to specialists. Dean also claimed that Hitchcock "is the last significant geological theorist who dabbles, who creates, who imagines, and the grand assurances, the flights of pious imagination, which characterize his works are tragic in their obsolescence. He is, of course, the last American geologist to leave a personal

---

[34] Edwin H. Colbert, *Men and Dinosaurs: The Search in Field and Laboratory* (New York: E.P. Dutton & Co., Inc., 1968), 39.

[35] Dennis R. Dean, "Hitchcock's Dinosaur Tracks," *American Quarterly* 21, iss. 3 (Autumn 1969): 642-643.

[36] Ibid,, 643.

mark upon our creative literature."[37] Dean cannot be faulted for failing to see the future, in which revisionist views of dinosaurs as active, warm-blooded and ancestral to birds would deeply influence popular culture and elevate some paleontologists to semi-celebrity status.

During the 1970s, several works analyzed Hitchcock and his beliefs in considerable depth, especially two articles from 1972. These two articles held somewhat opposed views of Hitchcock's views on science and religion: Philip J. Lawrence's "Edward Hitchcock: The Christian Geologist" and Stanley J. Guralnick's "Geology and Religion before Darwin: The Case of Edward Hitchcock (1793-1864)." Lawrence and Guralnick both summarized Hitchcock's career, though Lawrence gave more attention to Hitchcock's early life and conversion from Unitarianism back to Congregationalism. They both covered his debate with Moses Stuart. However, Lawrence claimed that Hitchcock's Genesis and geology harmonization attempts "revealed the tension of his life."[38] Lawrence portrayed a conflicted Hitchcock, reluctantly surrendering a global flood and gradually separating geology from natural theology. "Geology had ceased, partly through Hitchcock's own efforts, to be the undeveloped science so cordial to theology that had attracted him to its study…Geology would no longer harmonize with Scripture to tell a tale of salvation… While in 1864, Christian geology was by no means

---

[37] Ibid., 644.

[38] Philip J. Lawrence, "Edward Hitchcock: The Christian Geologist," *Proceedings of the American Philosophical Society* 116, no. 1 (February 15, 1972): 33.

an extinct calling, with Edward Hitchcock it ceased to be as [sic] a major trend in the history of American science."[39]

Guralnick, on the other hand, portrayed Hitchcock as relatively tranquil in his acceptance of continuing scientific discoveries and readjusting Biblical interpretation in their light. He explored Hitchcock's discussion of Divine law and miracles in considerable depth. He also noted the harassment campaign against Hitchcock incited by an anonymous atheist in 1851. Guralnick portrayed Hitchcock as moving from an insistence in the 1830s on direct correspondence between geological epochs and the creation days of Genesis to a renewed reliance on gap theory by the late 1850s. He claimed that "It must have been a welcome relief for Hitchcock to rid himself of the burden of exact correspondences."[40] Guralnick also highlighted Calvinist elements in Hitchcock's thought. In general, Guralnick emphasized the point I made above: that Hitchcock's anti-evolutionism should not lead to his dismissal as a "simple minded fundamentalist…or religious apologist…"[41]

Guralnick followed up this article with a 1975 book, *Science and the Ante-Bellum American College*. In this book, he argued that early American colleges had a more dynamic relationship in furthering science than was acknowledged by the previous scholarly consensus, which regarded them as relatively stagnant. Guralnick argued

---

[39] Ibid., 34.

[40] Stanley M. Guralnick, "Geology and Religion before Darwin: The Case of Edward Hitchcock (1793-1864)," *Isis* 63, no. 219 (December 1972): 541.

[41] Ibid., 543.

against the idea that the religious nature of most colleges before the Civil War hindered the adoption of science in their curricula. He concluded that

> there are no instances in the college literature of college presidents…using [science/religion debates] to chastise science or to suggest any diminution in the college's commitment to its study. [N]o instances appear when science teachers withheld information from their students or expressed judgments antithetical to world-wide scientific opinion because of community demands for religious conformity. [A]ll of the essential beliefs of Christianity…continued to be expressed by scientists without hypocrisy or impairment of their scientific acumen.[42]

To buttress his thesis, Guralnick quoted Hitchcock on several issues, including science/religion relations and the problem of inadequate science textbooks.[43] For Guralnick, Hitchcock was emblematic of a common type in antebellum colleges: a productive scientist with profound evangelical faith.

Other works in the mid-to-late 1970s explored the context of Hitchcock's work and some other facets of his career. An antiquarian magazine, *The New-England Galaxy*, explored his obsessive mountain-renaming. The article, by a professor of English at Amherst, made a factual error in attributing to Hitchcock his son's nickname ("The Old Doc") and was a popular rather than scholarly treatment. It is chiefly of interest as one of the few mentions of Hitchcock in semi-recent popular literature.[44] In 1976, Sally Gregory Kohlstedt described Hitchcock's vital role in the foundation of the American Association

---

[42] Ibid., 155.

[43] Guralnick, *Science and the Ante-Bellum American College*, Memoirs of the American Philosophical Society, vol. 109 (Philadelphia: American Philosophical Society, 1975). For Hitchcock on science/religion, see p. 155; on textbooks, see p. 68.

[44] Howell D. Chickering, Jr., "Edward Hitchcock's Mountain Mania," *The New-England Galaxy* 19, no. 4 (Spring 1978): 3-12.

for the Advancement of Science.[45] Her book is probably the fullest treatment of this phase of his career. However, Kohlstedt only briefly touched on Hitchcock's science/religion synthesis and geological achievements.

Gloria Robinson, an historian of science at Yale, wrote an article on Hitchcock for a 1979 anthology.[46] The anthology focused on 19th century Yale geologist Benjamin Silliman's influence on American science. Her article was essentially a biography of Hitchcock that focused on his close relationship with Silliman. Robinson included a great deal of unpublished material in the essay, especially Hitchcock's copious correspondence with Silliman. She highlighted an early letter in which Hitchcock confessed his religious compunctions about too great an enthusiasm for science. Robinson also included descriptions of Hitchcock's ichnological and survey work.

Herbert Hovenkamp included a description of Hitchcock's views and achievements in his 1978 work, *Science and Religion in America, 1800-1860*. Hovenkamp described the social and philosophical context underlying science/religion issues, focusing especially on Baconianism and Scottish common-sense realism and their attempted use to "unif[y]…knowledge and belief…to…devise…a 'scientific' theology that could prove everything."[47] He called attention to Hitchcock's use of analogies between natural phenomena (spring, a butterfly emerging from a chrysalis) and revealed

---

[45] Sally Gregory Kohlstedt, *The Formation of the American Scientific Community: The American Association for the Advancement of Science 1848-60* (Chicago: University of Illinois Press, 1976).

[46] Gloria Robinson, "Edward Hitchcock," in *Benjamin Silliman and his Circle: Studies on The Influence of Benjamin Silliman on Science in America*, ed. Leonard G. Wilson (New York: Science History Publications, 1979), 49-83.

[47] Herbert Hovenkamp, *Science and Religion in America, 1800-1860* (University of Pennsylvania Press, 1978), x.

religion (the Resurrection).[48] He described the Moses Stuart-Hitchcock controversy, and attempted to outline Hitchcock's views on Genesis and the Flood. Hovenkamp was definitely inaccurate in his description of Hitchcock's view of the Flood. He posited that Hitchcock always had one view of Noah's flood: that it was very extensive, if not worldwide, and that evidence for it was provided by the drift/diluvium phenomena.[49] In fact, as Rodney Stiling would show in 1991, Hitchcock's view of the flood changed no less than 4 times throughout his career. Hovenkamp concluded his book by damning evangelicals in the post-Darwinian era with faint praise.

> Scottish Realism became a dogmatic, simplistic and impotent philosophy. "Scientific" natural religion was a self-contradiction…In the face of increasing hostility from science, evangelicals maintained an admirable religious integrity and stability…As his position vis-à-vis science became more and more untenable, the evangelical faced in with an increasingly eyes-closed, mind-closed confidence. He accepted what ultimately proved to be among the most indefensible of irrationalities. [Hovenkamp does not indicate what the irrationality defended was; perhaps modern creationism or orthodox Protestantism as a whole.] His was a leap of faith that Kierkegaard would have admired.[50]

Hovenkamp's work as a whole is valuable in incorporating the framework of Baconianism and Romanticism into a general history of antebellum science. However, he relies exclusively on Hitchcock's published material, and misconstrues some of his views.

Between Hovenkamp's work and the end of the 1980s, very little research seems to have been done on Hitchcock's thought. Two paleontological symposia in 1986

---

[48] Ibid., 42-43.

[49] See Hovenkamp pp. 132-140, esp. 140-"Hitchcock had a long, successful career studying Genesis and geology. His views, however, changed very little."

[50] Ibid., 213-214.

discussed his ichnological studies in the light of current knowledge of dinosaur footprints. One of the symposia, *Dinosaur Tracks and Traces*, included two items of interest. New Mexico paleontologist R. Ted Steinbock contributed a brief sketch of Hitchcock's discoveries, including a section on his focus on Genesis and geology (relying heavily on Guralnick's work).[51] Two other paleontologists explicitly built on Hitchcock's perception of the avian nature of the footprints he had discovered. They photographed and mapped some of the footprints in Hitchcock's collection and compared them with tracks made by a large living flightless bird.[52] In the other symposium, *Dinosaur Systematics: Approaches and Perspectives*, William A. S. Sarjeant discussed the problem of classifying footprints as belonging to specific fossil species. In so doing, he gave an excellent summary of Hitchcock's pioneering attempts in ichnological classification.[53]

The most comprehensive work on Hitchcock's beliefs and background was done in the 1990s. Rodney Lee Stiling's 1991 dissertation on perceptions of Noah's Flood in 19th century American thought, "The Diminishing Deluge," focused on Hitchcock's changing thought on the nature of the Flood. Although it is not a biography of Hitchcock, it remains the only monograph in which Hitchcock is the main figure discussed. Stiling

---

[51] R. Ted Steinbock, "Ichnology of the Connecticut Valley: a vignette of American science in the early nineteenth century," in *Dinosaur Tracks and Traces*, ed. David Gillette and Martin G. Lockley (New York: Cambridge University Press, 1989), 27-32.

[52] Kevin Padian and Paul E. Olsen, "Ratite Footprints and the Stance and Gait of Mesozoic Theropods," in *Dinosaur Tracks and Traces*, 231-241.

[53] William A.S. Sarjeant, "A name for the trace of an act: approaches to the nomenclature and classification of fossil vertebrate footprints," in *Dinosaur Systematics: Approaches and Perspectives*, ed. Kenneth Carpenter and Philip J. Currie (New York: Cambridge University Press, 1990), 299-307.

made probably the most extensive use of Hitchcock's unpublished manuscripts to date, and the most sophisticated analysis of both his religious and scientific thought. However, since Stiling's focus was the Flood, he ignored many of Hitchcock's essays from the 1850s touching on general issues of science-religion interaction, and did not explore his deep romanticism.

Stiling has a degree in theology from Dallas Theological Seminary, and appears to be an evangelical intellectual. He tried to make a case for the scientific sophistication of antebellum evangelicals. He explicitly regarded the "science vs. religion" historiography of Draper and White as "skewed…In fact, theologically orthodox-- and in some cases very conservative--Christian geologists *led the way* in taking Americans to a local view of the Genesis Flood…The most celebrated conflicts, such as that between [Stuart and Hitchcock]…were over the right of geologists to interpret the Bible, not over 'biblical' versus 'scientific' views of geology."[54]"Throughout his dissertation, he tried to emphasize the evangelical and scientific credentials of figures such as Hitchcock and Silliman.

Stiling showed how Hitchcock's model of the Flood shifted four times throughout his career. Hitchcock initially was certain that the Flood was universal and that its marks were evident on the earth's surface, but he was not sure in what stratum they were to be found. Between 1819 and 1823, under the influence of French paleontologist Georges Cuvier, Hitchcock thought that Noah's Flood came about through a catastrophic sinking

[54] Rodney L. Stiling, "The diminishing deluge: Noah's Flood in nineteenth century American thought" (Ph.D. diss., University of Wisconsin-Madison, 1991), 11, emphasis Stiling's.

of ancient continents into the present seabed and vice versa. Hitchcock's second view of the Flood, according to Stiling, dated from 1823 to 1835. He still regarded it as universal, but caused by a wave sweeping the present continents from the north. In this phase, he was deeply influenced by the work of his British contemporary, geologist Rev. William Buckland. Buckland's study of fossils and deposits in caves, *Reliquiae Diluvianae* (1823), convinced Hitchcock of two points: that the prediluvial continents were the same ones as today, not the present seabeds, and that the remains of Noah's flood were to be located in the diluvial strata. Hitchcock's third view, which he held between 1836 and 1839, was that "though there had been an actual universal Genesis Flood, it had been so transient that no distinctive geological evidence of it remained."[55] A pre-Adamic universal flood had deposited the diluvium. Finally, from 1840 to the end of his life, Hitchcock held that Noah's Flood had been a catastrophic but local event, one that exterminated all of humanity (all humans being in the Mideast at the time of the flood). Either glaciers or deluge-borne icebergs had deposited the diluvium, now called drift by Hitchcock.

After Stiling's discussion of Hitchcock, he cited a wide variety of late nineteenth-century evangelical works to show that those which discussed the extent of Noah's Flood generally adopted a partial-flood approach, so much so that it became the "new orthodoxy."[56] Stiling felt it quite important to emphasize that conservative Christians in the early 1900s should not be thought of as sharing all the views of modern creationists.

---

[55] Ibid., 138.

[56] For Stiling's survey of evangelical literature attesting to the partial Flood, see ibid., 235-260.

Stiling concluded that the changing views of Noah's Flood in nineteenth-century America definitely did *not* represent a triumph of science over religion.

> It is rather a record of the triumph of integration over fragmentation. The grand object of the Christian Geologists, for example, was to possess fully and confidently *both* faith and science, as gifts from the One Author of both. Because the desire for this harmony was stronger than the loyalty to the details of any one interpretation of the Flood, Americans were willing to adjust their understanding of the Genesis Flood, both on the biblical side and on the physical side. It was for this reason, above all others, that for Americans of the last century, the Deluge diminished.[57]

Hitchcock's work has been used for explicitly ideological reasons in recent years. Davis Young is a professional geologist at Calvin College and an evangelical who is trying to combat literalist creationism. He might even be thought of as a modern Hitchcock. He cited Hitchcock's combination of rigorous scientific research and conservative theology as a model for modern evangelicals in *The Biblical Flood: A Case Study of the Church's Response to Extrabiblical Evidence* (1995). Young traced the use of scientific and literary information in interpreting the Flood from Biblical times to the present. He cited Guralnick and Stiling on Hitchcock, and concluded that

> The contemporary church would benefit immensely from a rediscovery of the compelling writing of…Hitchcock…[and other early Christian geologists]. [I]t is to their credit that they viewed the growing body of extrabiblical evidence devastatingly opposed to the traditional ideas of the deluge not as a threat to faith but as an occasion for reaching a better understanding of Genesis. Their considerable success in influencing late nineteenth-century conservative theology can probably best be attributed to the fact that they were very evidently committed to truth in both the realm of science and the realm of faith.[58]

---

[57] Ibid., 355.

[58] Davis A. Young, *The Biblical Flood: A Case Study of the Church's Response to Extrabiblical Evidence* (Grand Rapids, MI: Eerdmans Pub. Co., 1995), 152.

Young's work provides evidence that Hitchcock's views on science and religion are still relevant to current discussions of such issues. Even if the specifics of his exegesis are outdated, his work has resonance for those evangelicals opposed to absolute Biblical literalism.

In the 14 years since Stiling's work on Hitchcock, no one has attempted such a complete study of his work. That having been said, historian of astronomy Jordan Marché II has revealed other aspects of his life and career through several short papers in the 1990s. These do not constitute a fundamental revision of ideas about Hitchcock, but rather a deepening of understanding through the use of Amherst manuscripts. Marché once claimed that he was working on a biography of Hitchcock, but none has appeared yet, and he appears to have shifted to exploring the history of planetaria. Marché discussed Hitchcock's early astronomical career, including his debate with Edmund Blunt over Blunt's almanac's accuracy, Hitchcock's poetry and his ichnological work.[59]

In the past decade, scholars have focused on Hitchcock's influence on New England society and culture. Hitchcock's influence on Emily Dickinson's poetry seems to have been the subject most widely explored. Evidently the romantic imagery in his work deeply affected Dickinson, especially his speculations on the universe as a vast

[59] See Jordan D. Marché II, "Edward Hitchcock's Poem, *The Sandstone Bird* (1836)," *Earth Sciences History* 10, no. 1 (1991): 5-8; idem, "Edward Hitchcock, *Fucoides*, and the Ichnogenus *Scoyenia*," *ESH* 11, no. 1 (1992): 13-20; idem, "Edward Hitchcock's Promising Astronomical Career," *ESH* 12, no. 2 (1993): 180-186; idem, "Restoring a 'Public Standard' to Accuracy: Authority, Social Class, and Utility in the American Almanac Controversy, 1814-1818," *Journal of the Early Republic* 18, no., 4 (Winter 1998): 693-710.

telegraphic system recording men's deeds.[60] Hitchcock's deep romanticism, a previously neglected aspect of his work, has been explored briefly by Karen Haltunnen, who has analyzed his mountain-renaming in a more scholarly fashion than Chickering's sketchy treatment.[61] In 2005, Miriam Levin, a historian at Case Western Reserve University, published a study of women and science at Mt. Holyoke, which includes a brief treatment of Hitchcock as a romantic scientist.[62]

Finally, paleontologists and historians of paleontology are still debating the identification of some of Hitchcock's tracks and the accuracy of his work. Dennis R. Dean has claimed that Gideon Mantell, (who identified one of the first dinosaurs ever discovered) was correctly skeptical of Hitchcock's avian classification of fossil footprints, which turned out to be dinosaurian. His criticism of Hitchcock is unduly harsh: "Despite further wheedling by Silliman, Deane, and Hitchcock, [Mantell] was extremely reluctant to include hypothetical American birds among his various wonders of geology…[H]is final statement, in 1851, reemphasized the insufficiency of present

---

[60] See Eric Wilson, "Dickinson's Chemistry of Death," *American Transcendental Quarterly*, n.s. 12, no. 1 (March 1998): 27-43; Hiroko Uno, " 'Chemical Conviction': Dickinson, Hitchcock and the Poetry of Science," *Emily Dickinson Journal* 7, no. 2 (1998): 95-111; Paul Gilmore, "The Telegraph in Black and White," *English Literary History* 69, no. 3 (2002): esp. 818-819; Jerusha Hull McCormack, "Domesticating Delphi: Emily Dickinson and the Electro-Magnetic Telegraph" *American Quarterly* 55, no. 4 (2003): esp. 585-589; Carol Quinn, "Dickinson, Telegraphy, and the Aurora Borealis," *EDJ* 13, no. 2 (2004): esp. 65-68.

[61] Karen Haltunnen, "Mountain Christenings: Landscape and Memory in Edward Hitchcock's New England," in *New England Celebrates: Spectacle, Commemoration and Festivity: Proceedings of the Dublin Seminar for New England Folklife*, *June 23-25, 2000*, ed. Peter Benes (Boston University, 2002): 166-177.

[62] Miriam R. Levin, *Defining Women's Scientific Enterprise: Mount Holyoke Faculty and the Rise of American Science* (Hanover and London: University Press of New England, 2005), 38-46.

evidence, despite overwhelming professional support by others for Hitchcock's erroneous surmise."[63] As I will show in the next chapter, Hitchcock was quite ambivalent about the identity of many of the tracks all his life. Given the strong similarities between small dinosaurs and large flightless birds, it is anachronistic and unfair to criticize Hitchcock for his misidentification.

Robert T. Bakker, the maverick paleontologist who publicized the idea of warm-blooded dinosaurs, has defended Hitchcock's track identifications in a somewhat fulsome and quite informal recent tribute to him:

> Hitchcock—and only Hitchcock—deserves the rubric "Father of Jurassic Park." And in the 21st century the good Reverend's reputation most definitely deserves a makeover. The dino books I grew up with dismissed Hitchcock as a bungling footprint specialist who deluded himself into believing that dinosaur tracks in the Connecticut Valley red beds were made by nonexistent Jurassic birds… [Hitchcock was not] a naïve paleo-bumpkin. [He] didn't apply the "dinosaur" label to his tracks because the finest minds of European paleontology had reconstructed dinosaur feet and body form in a totally erroneous fashion…[resembling present reptiles or mammals.] Hitchcock knew that his Early Jurassic trackmakers were digitigrade and fundamentally avian, not plantigrade and fundamentally reptilian or mammalian.[64]

Other scholars currently dealing with Hitchcock's ichnology include G.C. Nadon and Emma Rainforth. Nadon, an Ohio geologist, has criticized Hitchcock's ideas on fossil track formation from the perspective of current sedimentology.[65] Rainforth, a

---

[63] Dennis R. Dean, *Gideon Mantell and the Discovery of Dinosaurs* (New York: Cambridge University Press, 1999), 200.

[64] Robert T. Bakker, "Dinosaurs Acting Like Birds, and Vice Versa—An Homage to the Reverend Edward Hitchcock, First Director of the Massachusetts Geological Survey," in *Feathered Dragons: Studies on the Transition from Dinosaurs to Birds*, ed. Philip J. Currie et al. Life of the Past, ed. James O. Farlow (Bloomington: Indiana University Press, 2004), 2.

[65] G.C. Nadon, "The Impact of Sedimentology on Vertebrate Track Studies," in *Mesozoic Vertebrate Life: New Research Inspired by the Paleontology of Philip J.*

British paleontologist now teaching in New Jersey, has digitized many of Hitchcock's ichnological reports and illustrations. She has recently completed a thousand-page dissertation on Hitchcock's ichnology, and plans to have it published in 2006. This will coincide with the opening of Amherst's new natural history museum, featuring Hitchcock's tracks.[66] Clearly, Hitchcock's paleontological discoveries and their interpretive problems remain live issues in the disciplines he helped found.

Nonetheless, none of these many studies has fully captured what Hitchcock believed and represented. Previous scholarship has accurately depicted Hitchcock as simultaneously a fiery evangelical and a highly rational scientist. However, Hitchcock's romanticism was much more central to his thinking than previous studies have indicated. Although he continually predicted his imminent death, even this morbidity seemed to fade in the face of his extravagant version of the afterlife. He hoped that he would be able to continue scientific studies in a sinless body after the Final Conflagration, with a higher and more spiritual perception of the universe and probably also of extraterrestrial beings. This strange vision became increasingly central to Hitchcock's ideas on science and religion late in his career, and was reiterated many times as a typical conclusion to his theological works of the 1850s and 1860s. By 1851, he had formulated an idea of geology being the seventh and climactic step in God's revelation of knowledge to

---

Currie, ed. Darren H. Tanke & Kenneth Carpenter, Life of the Past, ed. James O. Farlow (Bloomington: Indiana University Press, 2001), 399-401.

[66] For Rainforth's publications, see Emma C. Rainforth, "Publications ~ Emma C. Rainforth,"; accessed 19 September 2005; available from http://phobos.ramapo.edu/~erainfor/publications.html. For information on the new museum, see Nancy Pick, "Tracking a Dinosaur Pioneer," *Boston Globe Magazine*, 7 November 2004 [magazine online]; accessed 18 September 2005; available from http://www.boston.com/news/globe/magazine/articles/2004/11/07/tracking_a_dinosaur_pioneer?mode=PF

mankind. Geology, in Hitchcock's mind, could be considered truly a divine science. In one of Hitchcock's political speeches, he described an "Inseparable Trio" of education, religion, and freedom as being necessary in sustaining a successful country. I would argue that in Hitchcock's life and thought, his personal "inseparable trio" consisted of religion, rationality, and romanticism.

Chapter 2: Hitchcock's Life and Intellectual Development: Religion, Rationality, and Romanticism.

Edward Hitchcock's attempted science-religion synthesis can only be understood as one facet of his overall work. Thus, this section will describe Hitchcock's social, religious, and political views in a chronological framework. As will be seen, in his early 20s Hitchcock underwent a profound religious crisis that was to set him on the path of orthodox Calvinist Congregationalism. He would follow this theological path for life. After about 1820, he attempted to devote all subsequent life activities to the support of his central religious commitment. This did not in any way imply a dimunition of his commitment to accurate scientific research.

Early life and thought; Unitarianism (1793-1813)

Edward Hitchcock was born on May 24, 1793 in Deerfield, Massachusetts, the son of Mercy Hoyt and Justin Hitchcock. Hitchcock's father was a hatter, a soldier in the Revolutionary War, and a "deacon of the Orthodox [Congregationalist] church."[67] The Hitchcock family was poor, but respectable in Deerfield society. Hitchcock attended the Deerfield Academy after primary school. Some of Hitchcock's earliest intellectual writings date from the period of 1809-1811, when he was in late adolescence. During this period of his life, he had moved away from his father's faith and been attracted to Unitarianism. Hitchcock became interested in science through the efforts of his uncle, Maj.-Gen. Epaphras Hoyt. Hoyt introduced Hitchcock to "military science…to which I [Hitchcock] devoted myself with considerable interest, especially to fortification, when

[67] Hitchcock, *Reminiscences*, 281.

from fifteen to eighteen years of age. But he [Hoyt] was also deeply interested in astronomy and natural philosophy, and these branches became my favorites."[68] Hitchcock's first scientific work of note consisted of observations of a comet which was visible from Deerfield in 1811. These observations were set down by Hitchcock in one of his commonplace books in which he set down essays, notes, and plays during his adolescence and young adulthood.

Hitchcock recorded his early philosophical, social and political views, as well as his fledgling scientific work, in his commonplace books. Having joined a local literary group, the Society of Literary Adelphi, the 18 year old Hitchcock presented an essay on the comparison between humans in a state of nature and of civilization. He claimed that the state of nature was a miserable condition, and that uncivilized man

> can never advance but a few steps in intellectual progression: and his mental powers, like the unpolished diamond covered with rust, must remain in the depths of obscurity, unable to expand, and rise into the sublimities of science, or investigate even the theory of those arts which are necessary to his comfort and convenience.[69]

This may reflect an antipathy to the optimistic theories of human nature more prevalent, perhaps, among Democratic-Republicans in the Southern and Mid-Atlantic states at the time. It may also indicate that Hitchcock took a Hobbesian view of mankind in a state of nature.

Indeed, in many of his later sermons, he contrasted other cultures to those of

---

[68] Ibid., 284.

[69] Hitchcock, "An introductory address, delivered before the 'Society of Literary Adelphi,' at their seventh anniversary, Aug 8th 1811," Commonplace book no. 1, in Edward and Orra White Hitchcock Papers (Box 18, Folder 3), Archives and Special Collections, Amherst College Library (Hereafter Hitchcock mss.).

Protestant countries with regard to their level of ignorance and despotism. His attitude became increasingly contemptuous toward those cultures the more removed from Protestantism and European civilization they were. However, his perspective on race was only mildly prejudicial for his era. Hitchcock held that through the civilizing influence of the Gospel, any human could reach almost the level of the most advanced Caucasian. To quote one of his later works on the issue, from 1854:

> [I]n respect to the Hottentot and the negro, it is not true that they cannot comprehend scientific truths. You have only to subject them to the culture that has been bestowed upon civilized man, especially if continued through successive generations, and not only shall they be able to understand science, but it may be to rise almost to the level of the Newtons, the La Places, the Leibnitzes, and the Cuviers of proud Europe…[W]hen Africaner has been subdued by the gospel, and learns to aspire after knowledge, he shows that early discipline was alone wanting to make him as well known for mental and moral excellence as he was for savage ferocity.[70]

Returning to the 1811 essay, Hitchcock contrasted an uncivilized state of nature with civilized man; significantly, he focused on civilized man's ability to "penetrate the depths of science and art, and investigate the vast chain of nature, from deity, to the most minute insect which microscopic powers can discover; and from worlds unnumbered in the heavens, to the minutest particle in the earth."[71] Note Hitchcock's references to *science* and *deity*. This reflects Hitchcock's youthful Unitarian phase, where he seems to refer to God in a generalist sense, and references to Jesus per se do not come up. One can also see the early connection between science and religion in his assertion that science is said to investigate everything from God to microbes. This is a "Great Chain of Being"

---

[70] "The Religious Bearings of Man's Creation," in *Religious Truth, Illustrated from Science, in Addresses and Sermons on Special Occasions* (Boston: Phillips, Sampson, and Company, 1857), 206.

[71] Ibid.

reference typical for the era: popular science writers of the time tended to stress the harmonious and hierarchical nature of reality, with every organism and structure fitting in its "proper" place. This was associated with the pre-Darwinian concept of fixed species. Later in his career, Hitchcock would attempt to reconcile a commitment to a Great Chain of Being in nature with the reality of the extinction of animals over geological time.

In the science essay, Hitchcock gave a brief survey of the current state of science as of 1811, and mentioned various famous figures such as Newton. All sciences "conduct us to an acquisition of those incontrovertible truths which were constituted by deity himself and defy contradiction."[72] In addition to their religious application, the arts and sciences support civilization: "[They] divest the mind of prejudice and superstition, and give it that amplitude, which is so necessary in order to rightly distinguish between truth and error, and to fit us for the various stations in society."[73] Hitchcock's particular concerns here reflect the currents of New England Unitarian thought during the early national period. In the words of historian of American Christianity Mark Noll, "Unitarians promoted a benevolent God, a balanced universe, and a sublime human potential. [They advocated] an organic and orderly society, and…distrust[ed] the populist democracy of Jeffersonianism."[74] These general Unitarian preoccupations, combined with Hitchcock's particular affinity for the natural sciences, lead him to praise

[72] Ibid.

[73] Ibid.

[74] Mark A. Noll, *America's God: From Jonathan Edwards to Abraham Lincoln* (New York: Oxford University Press, 2002), 284.

scientific societies such as Britain's Royal Society and the American Philosophical Society.

Hitchcock regarded scientific societies as helping to "prevent…wanderings from the paths of reason, and improving a state of civilization…"[75] Though other types of benevolent societies could help with this goal, societies devoted to "enlarging the bounds of human knowledge and happiness, by making improvements in the arts and sciences"[76] seemed to have the greatest membership at the time Hitchcock wrote this essay. This fact, in addition to a mention of the prestige of the scientific Royal Society of London, was used by Hitchcock to justify the addition of the Society of Literary Adelphi to the ranks of such societies. This rather high-flown rhetoric probably reflects Hitchcock's youthful enthusiasm for science, and is somewhat unconvincing.

Only through the liberation of humanity from its passions and the development of civilization could men gain sufficient detachment to investigate science properly. Hitchcock concluded his speech with a hope that the Society of Literary Adelphi would live up to the standards of the great scientific and literary societies of the time, and fight "the rapid progress of French principles, which like the poison Upas[77] of the Island of Java, destroy every thing within their reach worth preserving…"[78] Hitchcock noted that the United States was preparing for war (the essay was written a year before the War of

---

[75] Hitchcock, "An introductory address."

[76] Ibid.

[77] The upas is "the poisonous milky sap of a large…tree, *Antiaris toxicaria*, of Java, used for arrow poison." *Webster's Unabridged Dictionary of the English Language* (1989), s.v. "upas."

[78] Hitchcock, "An introductory address…," underlines Hitchcock's.

1812), and that the Society should "improve to the utmost in our power, the advantages we at present enjoy;"[79] What he meant is that the Society, by pursuing the improvement of arts and sciences, would enable its members to be more effective at serving their country once peace returned.

Hitchcock's enthusiasm for promoting scientific organization can thus be seen to date back to his early address to the Society of Literary Adelphi. He would continue in this vein through his membership in the short-lived geological associations of the 1820s. His organizational efforts culminated in the setup of the American Association of Geologists and Naturalists in the 1840s, the predecessor organization to the American Association for the Advancement of Science.

Next to the Society of Literary Adelphi speech in young Hitchcock's commonplace book is a somewhat rambling essay, on the state of liberty in the world as of 1809-10. This supplements the previous speech and gives a more comprehensive picture of his worldview prior to conversion to orthodox Calvinist Congregationalism. In essence it can be considered an immature rumination on freedom. Hitchcock's convictions on what was necessary to sustain freedom in a country would change over the years. Specifically, the necessity for vital Protestant religion as a prop for freedom would occupy some of his later writings. The pessimism in this early essay can perhaps be attributed to the approach of the war of 1812, opposed by most New Englanders.

In the essay on liberty, Hitchcock regarded liberty as second only to health as a blessing. Pessimistically, he contended that "Never perhaps before has the historian been obliged to record a period, when the civilized world felt less the benign effects of

[79] Ibid.

freedom, and the tenfold horrors of despotism more than the present."[80] Leading the trend of despotism was France under Napoleon, which "presents a gloomy persective [sic] of all the horrors of despotism."[81] Because of Napoleonic expansionism, Spain and Portugal were in danger of falling under even worse forms of tyranny than their former absolute monarchies. The Italian and Dutch republics were being subsumed by the great powers and corrupted by French principles. England "tastes the sweets of national liberty in as great a degree perhaps as any nation in the civilized world"[82] although currently in a wartime situation.

Hitchcock then took what seems to be a swipe at the Democratic-Republican Madison administration. He noted that in America, "the people of this government have been grossly deceived…the rights of her inhabitants have been abused, and that the period is not far distant when…tyranny will prostrate the fair fabrick of our constitution…"[83] The rest of the civilized world seemed to be ensconced in hopeless tyranny, with the partial exception of China. Liberty remained mostly "amongst those who are styled the savages of the wilderness,"[84] such as the nomads of Asia and American Indians. Hitchcock concluded the essay with a worry that these savages may never accept civilization, if that means accepting despotism.

---

[80] Hitchcock, "On the present state of liberty," Hitchcock mss.

[81] Ibid.

[82] Ibid.

[83] Ibid.

[84] Ibid.

Hitchcock's early worldview is seen through these early commonplace book writings. He was a Unitarian of Federalist, strongly anti-French tendencies. The link between civilization, science, liberty, and religion is already present, although religion seems distant and subdued. In Hitchcock's later sermons and writings, this perceived unity was developed and reworked to accommodate Calvinist Congregationalism. His political thought reached an apogee with his sermon of 1850, *The Inseparable Trio*, delivered to Massachusetts's governor George N. Briggs and the Massachusetts legislature at the annual election. In this sermon, he advised that a nation must possess freedom, education and religion (read evangelical Protestantism) to be truly happy.[85] In many of Hitchcock's writings, from the earliest onward, he returned to the example of revolutionary and Napoleonic France as an example of the horror following on a disconnection of science from religion.

Hitchcock's life seems to have proceeded on this scientifically oriented Unitarian path until he was 21, in 1814. He recalled that he "seized upon every moment I could secure…for [scientific] studies. I was treated very leniently by my father and brother, who probably did not know what to do with me, but saw plainly that I should not become distinguished as a farmer."[86] Hitchcock was planning to apply to Harvard when illness changed his prospective career, his religion, and ultimately his entire worldview.

Crisis, Conversion, Controversy, and Ministry (1814-1825)

---

[85] See Hitchcock, *The Inseparable Trio* (Boston: Dutton and Wentworth, State Printers, 1850).

[86] Hitchcock, *Reminiscences*, 282.

There are two primary documents that describe Edward Hitchcock's conversion (or reversion) to orthodox Congregationalism. One is his 1863 autobiography, *Reminiscences of Amherst College*. This is a rather truncated recollection, far removed from the actual events of 1814-20. However, it provides a useful summary as to how his convictions changed. The other is a manuscript "Memorandum" Hitchcock wrote to himself. The archivists at Amherst have dated it to between 1820 and 1830, and it contains his private reflections. It is difficult to say if these reflections were intended for public consumption. In *Reminiscences*, Hitchcock noted that his religious views changed "in spite of my own efforts, and in apparent opposition to my worldly interests."[87] During the spring of 1814, while studying classical languages in preparation for application to Harvard, Hitchcock came down with the mumps. This disease impaired his eyesight considerably. This ruined his budding astronomical career, and the inability to study ended his chances for acceptance to Harvard. The visual impairment gave him time to reflect, and between 1814 and 1816 he decided not only to accept orthodox Calvinism, but to

> study for the Christian ministry, having been led by my trials to feel the infinite importance of eternal things, and the duty of consecrating myself to the promotion of God's glory and man's highest good.[88]

In good Calvinist fashion, he felt that God had called him to the ministry through his illness. In the *Reminiscences*, Hitchcock expressed some regret that he has had to separate from the beliefs of many of his worldly friends, in order to take on the "plain

[87] Ibid., 283.

[88] Ibid., 286.

old-fashioned doctrines of the Puritans…but I could not shrink from it with a good conscience."[89]

The complexities of Hitchcock's religious crisis were brought to the fore in his "Memorandum" of 1820-1830. It certainly postdates his 1821 marriage, but I cannot ascertain the exact date. Here he admitted that though "I never really disbelieved the Bible, yet I wholly neglected it, and was entirely skeptical as to its peculiar doctrines." [90] During his illness, he came to the conclusion that his skepticism was insupportable. "Neither philosophy nor Unitarianism could staunch my bleeding heart."[91] In the spring of 1815, Hitchcock began to realize that he was "a sinner. The necessity I was under to pray daily in an Academy and some other circumstances of too delicate a nature to be here mentioned, contributed greatly to produce this state of feeling."[92] Hitchcock said that the deathbed conversion of an irreligious close friend in mid-1815 proved a final turning point. This caused Hitchcock to beg for a Christian (probably orthodox Congregationalist) friend's prayers on his own behalf. According to the memorandum, Hitchcock began begging to be saved by Christ. At the same time, he remained uncertain

[89] Ibid., 283.

[90] Hitchcock, "Memorandum" on Hitchcock's "conversion to Christ and the Orthodox faith," ca. 1820-1830, Hitchcock mss. The "peculiar doctrines" phrase is probably a reference to Calvinist tenets such as predestination.

[91] Ibid.

[92] Ibid. This mention of "delicate circumstances" could indicate a love affair or other sexual matter, in the parlance of the time.

of the veracity of central Christian doctrines such as "total depravity…justification by faith…the divinity of Christ."[93]

As of late 1815, Hitchcock still associated orthodox Congregationalism "with ignorance and bigotry, and inquisitorial intolerance." [94] His eyesight evidently having improved, he decided to read the entire Bible, and see whether it fit Unitarian or Orthodox doctrine. His conclusion was that the Bible expresses "the leading truths of evangelical religion [orthodoxy]."[95] He also claimed that he misunderstood the tenets of Orthodoxy, thinking that it held to such doctrines as the damnation of unbaptized infants. Having interacted with both Unitarians and the Orthodox during his work, he observed that the Orthodox seemed to let their religious principles decisively influence their way of life. The Unitarians, on the other hand, seemed to have relatively little interest in making religion the center of their lives.

In early 1816, Hitchcock decided to begin study to become a minister, though his religious crisis was not yet resolved. By mid-1816, Hitchcock seems to have settled on becoming an orthodox Congregationalist. He attempted to set up a weekday religious meeting in Deerfield lead by him and several of his Orthodox friends. The band read sermons by various Orthodox/evangelical writers. He believed that the participants were indeed tending towards a revival, and "the report got abroad that there was a tendency to

[93] Ibid.

[94] Ibid.

[95] Ibid.

enthusiasm."[96] This revivalist enthusiasm was anathema to Unitarians in the area. Forty attendants "professed religion," but many simultaneously remained Unitarian. Hitchcock emotionally noted, "Oh that I had then taken a stand on the truth, and had known how to conduct a revival!"[97] He seems to have been in some agony as to the religious fate of Deerfield, possibly an indicator of how strong Unitarianism was there. He then noted that he went to New Haven in 1820 to complete his theological training, though he still retained some residual fears of "an intolerant Jesuitical spirit among the Orthodox."[98] However, his experience at Yale seemed to have removed those preconceptions. Hitchcock concluded the Memorandum with the declaration that the faith and good example of his wife, Orra White Hitchcock, and his experiences at New Haven, had grounded him firmly within Orthodox Congregationalism: "From that period [New Haven circa 1820-1821] to the present [before 1830]-my confidence in the truth of the Evangelical system of doctrines has been confirmed more and more by every fresh accession of knowledge and experiences…"[99]

---

[96] Ibid. "Enthusiasm" in this context refers to the individualized, emotionally intense experiences (outbursts, screaming, etc.) commonly attending revivals. Enthusiasm was a subject of debate during the two Great Awakenings. Some Congregationalists and Unitarians were opposed to enthusiasm because it diminished church and doctrinal authority.

[97] Ibid.

[98] Ibid.

[99] Ibid.

One of the most important professional relationships in Hitchcock's career was cemented during his theological training at New Haven[100]: his friendship with Benjamin Silliman. Silliman was a professor of chemistry and, later, geology at Yale. Their friendship began when Hitchcock sent Silliman "a box of minerals for identification" in 1817[101]. Silliman and Hitchcock began an extensive correspondence, and Silliman did three very important favors for Hitchcock.

Firstly, he persuaded Yale College to grant Hitchcock an honorary M.A in 1818. Secondly, he enabled Hitchcock to attend his lectures in geology and other professors' lectures in theology at Yale while Hitchcock was training for the ministry. Hitchcock realized that he needed more sophisticated theological and scientific training than he could get in Deerfield. He thus attended lectures at Yale until the beginning of his tenure as pastor of the Congregational church at Conway, Massachusetts, in June 1821. Probably most importantly, Silliman offered important assistance in getting Hitchcock's first geological writings published.

Before publishing on geology, Hitchcock attended the natural history lectures of the peripatetic geologist Amos Eaton in 1816. The lectures were located in the town of Amherst, with which Hitchcock would soon be intimately associated. Eaton's lectures first stimulated his interest in geology proper. Hitchcock found that going on nature hikes and examining specimens of minerals or plants seemed to have a salutary effect on

[100] Hitchcock seems to have "audited" the classes, and received an honorary Master of Arts. He never had a full nonhonorary college degree.

[101] Gloria Robinson, "Edward Hitchcock," in *Benjamin Silliman and his Circle: Studies on The Influence of Benjamin Silliman on Science in America*, ed. Leonard G. Wilson (New York: Science History Publications, 1979), 50.

his health. This integration of the health and moral benefits of natural history would remain a concern throughout his life.

Hitchcock had already entered into the first of several scientific controversies during his career between 1817-1818. He discovered serious errors in the American edition of a standard British nautical almanac. The American edition was edited by Edmund M. Blunt of New York. As Hitchcock noted in his 1863 *Reminiscences*, he would not have looked carefully for errors, "had not Mr. Blunt placed beneath the opening page of every month, the sentence, 'ten dollars will be paid on the discovery of an error in the figures.'…I soon found that I would accumulate money rapidly if the offer was fulfilled."[102] Hitchcock's relatively impoverished state doubtless made such an offer all the more attractive. He enumerated the errors in a letter to *The American Monthly Magazine and Critical Review* in 1817, noting that he had written to Blunt "several times on the subject; but his answers were evasive and unsatisfactory."[103]

Blunt's January 1818 response was contemptuous, trying to explain away the errors, and claiming that "a few remarks only are necessary to explain the man's drift."[104] He claimed that the errors were minor and in the astronomical section of the almanac, not the more crucial marine navigational section, and challenged Hitchcock to find errors there. Unbenownst to Blunt, Hitchcock had already sent the magazine more errors from the navigational section, which appeared in the next issue. In July 1818, Hitchcock

---

[102] Hitchcock, *Reminiscences*, 311-312.

[103] Hitchcock, "Original Communications," *The American Monthly Magazine and Critical Review* 2, no. 2 (December 1817): 90.

[104] Edmund M. Blunt, "Original Communications," *American Monthly Magazine* 2, no. 3 (January 1818): 169.

published a list of yet more errors in Blunt's almanacs for the previous five years. He commented, somewhat sardonically, that he was glad that Blunt's new 1819-edition almanac contained "a modest preface, without any 'pledges of reputation' for infallibility, or offers of reward for the discovery of errors."[105] Hitchcock noted that he was forced to publish the errors because of the lack of satisfactory reply when writing to Blunt personally, concluding that "whenever I may chance to notice any errors of magnitude in a work of such vital importance as the Nautical Almanac, I shall consider myself bound to offer them for publication, whether they be made by A, B, or C."[106]

Blunt replied to the magazine somewhat sheepishly in August 1818, admitting to some of the errors, while denying others. He said that Hitchcock was "entitled to much credit for his perseverance…[and I] beg him to accept my thanks for the information, whatever may be his motive."[107] He never paid Hitchcock anything.

At the end of his life, in *Reminiscences*, Hitchcock looked back on the controversy and mused that if the incident had occurred then, he would have sued Blunt for the reward. However, he claimed that his richest reward was "the mental discipline required."[108] As he was an unknown and poor young man, his entry into the world of the scientific community had to be conducted with absolute accuracy. If his calculations had been in error, his reputation would have been marred from the start. Hitchcock's

---

[105] Hitchcock, "Original Communications," *American Monthly Magazine* 3, no. 3 (July 1818): 211.

[106] Ibid, 212.

[107] Blunt, "Original Communications," *American Monthly Magazine* 3, no. 4 (August 1818): 296.

[108] Hitchcock, *Reminiscences*, 313.

recounting of the story does seem rather adolescent, considering that he told it in his last work as a retired college president at the age of 70. It is possible that Hitchcock still felt keenly his lack of a formal college education, and was still looking for prestige.

Many times in his struggle with biblical literalists, Hitchcock would point out the folly of dogmatizing on a scientific subject without making the effort to ascertain whether one fully understands the subject one is pronouncing on. The Blunt experience seems to have taught Hitchcock the importance of persevering in controversies when he knew (or thought) he was correct. Hitchcock would continue to assert his rectitude in a number of other cases. These cases included an 1836 controversy with the Hebrew philologist Moses Stuart on the proper interpretation of Genesis, in which Hitchcock described his views on science and religion in depth. Less important in understanding Hitchcock's thought, yet far more acrimonious, was a dispute with Dr. James Deane. This dealt with whether Hitchcock or Deane had identified the significance of fossil footprints first. The Deane controvery would last from 1844 to the end of Hitchcock's life.

Thus, the Blunt controversy illustrates Hitchcock's style as he entered the scientific community, and presages later debates. Hitchcock viewed the adherence to mental discipline and accuracy to be "one of the most valuable of all experiences in early education, and without it a literary man will go stumbling through life."[109] Beneath this veneer, though, one can certainly detect a healthy amount of ambition and desire for vindication.

At this point in Hitchcock's life (Fall 1817), his newfound friend Silliman "wrote that he was thinking of publishing a scientific journal and would be pleased to include

[109] Ibid., 314.

Hitchcock's work in the first issue."[110] His interest in geology having been stimulated by Eaton's lectures, Hitchcock had drawn a map of the different rock layers near the Connecticut River in parts of Massachusetts, New Hampshire, and Vermont. He contributed an article describing the rocks, together with the map, to the new *American Journal of Science*. In addition to noting the mineralogical composition of the rocks, Hitchcock noted the order in which the rock strata occurred. He used Wernerian terminology to describe the strata order. A small amount of background is necessary here. Abraham Gottlob Werner (1749-1817) was "[t]he champion rock classifier of Europe" as geology was becoming a systematic science. He had divided rocks into three main groups: The Primary (our Precambrian and Paleozoic), Secondary (our Mesozoic), and Tertiary (our Cenozoic).

> The Primary rocks were usually crystalline and lacked strata; they contained no fossils but were often rich in ores. These rocks were attributed to an early period in Earth history. Overlying them, and hence younger, were the 'Secondary' rocks, which were stratified and often rich in marine fossils. Then there were the 'Tertiary' rocks of still younger age, consisting of fossil-bearing clay and sand; these rocks were also stratified. Later, rocks were found that were intermediate between Primary and Secondary in age and other attributes; these made a fourth category, the 'Transition' rocks. In addition, the superficial sediments washed down from the mountains by rain and streams were distinguished as 'Alluvium'.[111]

Wernerian stratigraphy tacitly assumed an earth older than the ≈5000 years allotted by a literal reading of Genesis. Werner also postulated that all rocks had gradually precipitated out of a primeval ocean. Yet Hitchcock seems to have publicly evaded the

---

[110] Robinson, "Edward Hitchcock," 51.

[111] David Young, *The Discovery of Evolution* (London and Cambridge: Natural History Museum Publications, Cambridge University Press, 1992), 67-8.

idea of an ancient earth for the first several years of his geological career. Though he ruminated about geologic time in 1819-1820 manuscripts, he first advocated geologic time in a public forum in his 1823 sermon, "The Utility of Natural History," which will be discussed in Chapter 3.

This first published geological paper from 1819 contains several interesting features besides the geology, which provide information as to Hitchcock's attitude towards nature. While referring to the rock layers, minerals, and topography of the Connecticut River area, Hitchcock interspersed comments about the archaeological, the scenic, and the romantic qualities of the area. This pattern would reappear in his geological surveys of Massachusetts in the 1830s, where a section dedicated to "Scenographical Geology" was included along with sections on physical and economical geology. For example, in this first geological paper, Hitchcock described a waterfall on the Connecticut river. "The pleasure derived from the river proceeds more from its wildness than its sublimity."[112] He continued to refer to the varying sublimity and beauty of various peaks and overlooks in Massachusetts in subsequent works. The continued references to these terms strongly suggests that Hitchcock read Edmund Burke's *A Philosophical Enquiry into the Origin of Our Ideas of the Sublime and the Beautiful* (1757). It is already evident in this early paper how Hitchcock saw more in nature than simply natural features, and references to the "sublime" indicate that he perceived something transcendent in nature. Eventually, he developed his view of

[112] Hitchcock, "Remarks on the Geology and Mineralogy of a Section of Massachusetts on Connecticut River, with a Part of New-Hampshire and Vermont," *American Journal of Science* 1, no. 2 (1819): 111.

nature so as to see not only the work of God the Creator in it, but also indications of Christian truth ("the Cross in Nature, and Nature in the Cross.")

The interspersed "nonscientific" matters in Hitchcock's first geological paper may have been typical for the era. The very term "science" was only beginning to replace the traditional term "natural philosophy." The term "scientist" was only coined in the 1830s, and was despised by most practitioners of the sciences until quite late in the century. Even Silliman, when beginning the *American Journal of Science*, titled it *The American Journal of Science, More Especially of Mineralogy, Geology, and the Other Branches of Natural History; Including also Agriculture and the Ornamental as well as Useful Arts.* (He soon shortened it to the *American Journal of Science and Arts*, and thereafter simply *The American Journal of Science*. Initially, Silliman "also invited communications on music, sculpture, engraving, painting, and, more generally, on the fine and liberal as well as the useful arts."[113] Thus, Hitchcock's multifarious references should not be taken as a deviation from scientific practice in the 1810s. However, it does speak to his essential character. He was a romantic naturalist at the same time as being a fierce evangelical Congregationalist and saw no contradiction in this position.

Hitchcock's interest in science and nature continued through the four years of his ministry at Conway parish in Massachusetts. Hitchcock finished his theological studies at Yale in 1821 and married Orra White on June 13. Hitchcock commenced his ministry, giving almost 300 sermons to his congregants over the next 4 years, as measured by the number preserved in the Amherst archives. He also led several revivals. His sermons

[113] John C. Greene, "Protestantism, Science, and American Enterprise: Benjamin Silliman's Moral Universe," in *Benjamin Silliman and His Circle*, 17.

show that he had become a decided Calvinist. A few excerpts from two of his more purely theologically-concerned sermons will illustrate his religious style and position.

In a sermon entitled "Morality Not Inconsistent With Entire Depravity," Hitchcock attempted to clear up supposed misunderstandings of the traditional Christian doctrine of unsaved man's complete natural depravity. He noted that the popular understanding of "total depravity" had often been that "if man be totally depraved he is as bad as he can be. Even devils can be no worse. Now this is by no means the meaning of this phrase."[114] The totality of depravity means rather that humans are utterly alienated from God, and that this alienation extends to all human faculties. Hitchcock contended that the opponents of total depravity claim that it implies that men's natural characters lack anything that is "honorable or upright or kind or amiable but they exhibit one unalleviated ~~mass of~~ picture of crime and corruption- And since this is contrary to facts this doctrine cannot be true-"[115]

Hitchcock then proceeded to give his view of what total depravity truly meant. There are things in unconverted human nature, he asserted, which are "innocent in themselves", such as "fear of suffering & the desire for happiness."[116] These traits become sinful or holy based on the motives that underly them, namely love or hatred for God. There is a certain amount of benevolence naturally present in human nature. Men can be loyal, charitable, and kind as regards fellow human beings. In short, there do exist, without conversion, those benevolent people "in who[m?] so far as this world is

[114] Hitchcock, "Morality Not Inconsistent With Entire Depravity." Sermon no. 105 on Psalms 58: 1-2, April 1822, Hitchcock mss., words crossed out in the original ms.

[115] Ibid.

[116] Ibid.

concerned all confidence may be placed."[117] The crucial point Hitchcock wished to make is that even the most benevolent person is totally depraved by nature with regard to heavenly things. Depravity thus consisted, at its core, of "neglecting to love & to serve God- in neglecting the first & the greatest commandment." [118] This understanding of total depravity was his version of one of the core underlying dogmas of Calvinism.

Having made this fundamental point, Hitchcock continued with the observation that it is very common to find that God, the giver of all positive character traits, is neglected by those who manifest those traits. One's affection must be supremely to God to be truly religious. He bemoaned the fact that "it is next to impossible to convince moral & amiable men of this grand distinction between worldly morality & care to God."[119]

Another important sermon of Hitchcock's from the Conway ministry illustrating his theological position was on the concept of "Election," or the predestination of a certain segment of humanity to be saved. Given the more explicit Calvinist nature of this doctrine, Hitchcock acknowledged immediately that his view of election was controversial. "[T]he bare mention of it often excites in the bosoms of some hearers a regret that the preacher should engage in a subject so deep & difficult & unprofitable while others find a positive disgust excited within them at the term election…"[120] The controversy to which Hitchcock refers probably indicates Unitarian opposition to the

[117] Ibid.

[118] Ibid.

[119] Ibid.

[120] Hitchcock, "Election." Sermon no. 125 on Isaiah 58: 1-2, September 1822, Hitchcock mss.

concept of election. Hitchcock intended the sermon to help determine whether election is "a doctrine of Scripture or not."[121] He claimed that if it proved to be a Biblical doctrine, then all Christians must subscribe to it. Thus, Hitchcock looked at the exact meaning of Biblical verses which seem to indicate a concept of election. His general thesis is as follows:

> …[T]he doctrine of election as taught in the Bible is perfectly consistent with the free agency of man- that it renders no sinner less guilty in the sight of God- that it does not throw a bar in the way of any one's coming to Christ- that it does not render the use of means [?] unnecessary and if any perish finally they will blame themselves as much as if no such doctrine ever existed…[122]

Hitchcock admitted that one has to reconcile several contradictory verses to make such conclusions possible, but if the Bible has such verses, they all must be true. Hitchcock cites verses from Isaiah as to God's sovereignty over the universe, and then cites verses from Paul's epistles to the effect that "whom He did foreknow he did also predestinate to be conformed to the image of His son that he might be the first born among many brethren."[123]

While Hitchcock continued to have a keen interest in science during his ministry at Conway, he feared that his pursuit of geology and other disciplines might be self-serving and irreligious, as he wrote his friend and colleague Silliman:

> [My intense interests in the scientific disciplines] make me fearful I was not in the way of duty and to suspect that I might be worshipping idols- and if these pursuits be the right eye that must be plucked out let

---

[121] Ibid.

[122] Ibid.

[123] Ibid.

> them not be spared however painful the effort- Now the thought has occurred to me that you might have had the same trials to go through and therefore might be able to counsel me. Pray tell me if you can the remedy in such a case- Must these pursuits be altogether abandoned? or is there such a thing as pursuing them with a supreme reference to the glory of God? Or does the difficulty lie in attending them so eagerly? I put these enquiries to you because a mere theologist it seems to me could not answer them satisfactorily- There is however this difference between your case & mine- you attend to these subjects professionally- I only relaxationally.[124]

Hitchcock's worries notwithstanding, he continued to publish scientific papers during his years at Conway. Perhaps the most significant work of those years was his 1823-24 report on the geology of the Connecticut Valley. In some ways, this can be considered an expansion of his earliest paper. However, it is more systematic and much larger (154 vs. 17 pages). Hitchcock divided the report into 4 parts, dealing with the general geology, mineralogy, scenery, and "miscellanies" along the Connecticut Valley. This structure is very similar to his division of subjects for his later geological surveys.

At this point, his view on Noah's flood was changing from his first view (Cuvierian) to his second (Bucklandian), as outlined in the discussion of Stiling above. He now regarded the presence of erratic boulders as having been caused by some sort of deluge, quite possibly the Noachic one. He was therefore zeroing in on the "diluvium" as the repository of the visible effects of Noah's flood. "[W]e must look for the cause of [erratic boulders]…as far back at least as the Noachic deluge.—No current of water with

---

[124] Hitchcock to Silliman, 1 December 1822, cited in Robinson, "Edward Hitchcock," 53.

which we are now acquainted is sufficient to transport such masses of rock into the situations in which find them."[125]

Three additional features of this paper should be noted in particular: 1) Hitchcock's views on geological theories; 2) Hitchcock's Baconian philosophy of science; and 3) the continued presence of Romantic motifs .

First, while Hitchcock continued to use some Wernerian terminology in the description of the rock layers, he notes that he is skeptical with regard to overarching systems of theoretical geology:

> [Geological] systems have been productive of great good by spurring forward geologists to the collection of facts with a rapidity almost unequalled in any other science. When these shall be still farther accumulated, it is hoped and may be expected, that a second Werner will arise, who, having not merely the rocks of Germany, but of the whole world before him, and following the inductive method of Bacon, will be able to construct a system of geognosy that will stand, like the Newtonian system of gravitation, on a foundation too firm to be moved. Perhaps such a system, after all, will prove to be an amalgamation of the theories of Werner and Hutton, and those names, which now form the watch words of opposing ranks, may descend to posterity, engraven side by side, in harmonious union, on the column that supports the system.[126]

There was considerable dispute during this period (approximately 1800-1830) as to the origin of the earth's structures between the followers of Werner and those of the Scottish geologist James Hutton. As noted above, Werner posited the precipitation of

---

[125] Hitchcock, "A Sketch of the Geology, Mineralogy, and Scenery of the Regions contiguous to the River Connecticut; with a Geological Map and Drawings of Organic Remains; and occasional Botanical Notices…Part IV: Miscellanies," *American Journal of Science* 7, no. 1 (1824): 17.

[126] Hitchcock, "A Sketch of the Geology, Mineralogy, and Scenery of the Regions contiguous to the River Connecticut…Part I," *American Journal of Science* 6, no. 1 (1823): 60.

rock from a primeval ocean, and Hutton's followers held that at least the great structures of granite and basalt which underlay the continents and oceans had solidified from molten rock. Hutton also claimed that the planet had undergone vast cycles of slow change over an indefinitely long (that is, not specifically quantifiable, e.g. 4.5 billion years) past.

The reference to Baconian induction is very common for pre-Darwinian Anglo-American science. Many scientists of this period tended to distrust systems based on theoretical constructs and claimed to follow a methodology of fact collection, followed by induction from those facts to a general conclusion. Philosophers of science during this period often used Newton's theory of universal gravitation as an example of a theory which had been "proved" through this method. Theories of the evolution of life were often criticized as being insufficiently inductive before the acceptance of Darwinian evolution. However, as philosopher of biology David Hull notes: "It is certainly true that Darwin had not provided a complete induction, but neither had Newton or any of his followers. Those sections in the writings of…early philosophers of science in which they claim to show that Newton's logic of discovery and justification accord with their own exposition have almost no relation either to Newton's theory or to historical fact. The major difference was that Newton's theory was accepted. It was part of the received doctrine."[127] In citing Baconian induction, Hitchcock was indicating that he subscribed to the prevailing scientific ideology of the time.

---

[127] David L. Hull, *Darwin and His Critics: The Reception of Darwin's Theory of Evolution by the Scientific Community* (Cambridge: Harvard University Press, 1973), 29.

Finally, Hitchcock continued to write in a Romantic vein in the third part of the paper, noting that "we here find a rich diversity of scenery, so that not only the geologist, but the poet and the painter, and every man of correct taste, will find an interest in its beauties. My object at this time is to refer to a few of the most interesting and romantic spots along this river, annexing a short description to each…"[128] Hitchcock would often attempt to persuade readers of his works of the healthful and morally positive aspects of going on natural history excursions.

Indeed, it was a concern for health that caused Hitchcock to resign his post as minister at Conway. From a survey of his writings in science, religion, and all other matters, it appears that he was a severe hypochondriac. Hitchcock did have some genuine illnesses. The *Dictionary of Scientific Biography* identifies them, probably from Hitchcock's self-diagnosis, as "chronic intestinal and gall bladder complaints."[129] Hitchcock was constantly anticipating death, and included introductory remarks to many of his papers to the effect that the papers might be his last work. Hitchcock was offered the position of Professor of Natural History and Chemistry at Amherst College in 1825, while still a minister at Conway. Amherst was quite a young college, having been founded four years before Hitchcock's appointment, in September 1821. Following the offer, Hitchcock requested and then received a dismissal from his pastorate, citing the health benefits of an academic position in natural history. In *Reminiscences*, Hitchcock noted that "[i]t seemed to me probable that the change, and the great amount of physical

---

[128] Hitchcock, "Geology of the Connecticut, Part III. Scenery," in *The American Journal of Science* 7, no. 1 (1824): 2.

[129] Michele Aldrich, "Hitchcock, Edward," in *Dictionary of Scientific Biography*.

exercise requisite in such a professorship, might enable me to hold out a few years. This was all I then expected…I was dismissed October 25th, 1825…[from the Church at Conway]"[130] The end of the Conway ministry and beginning of the professorship may also have provided Hitchcock with relief for one of his religious quandaries; now he as well as Silliman could claim to be practicing natural history "professionally" and not merely "relaxationally."

Professorship, Temperance Work, Geological Surveys, Ichnology, and Scientific Professionalization (1825-1844)

Having received his new appointment, Hitchcock spent the next few months with his colleague and mentor Benjamin Silliman, who gave him training in chemistry. Hitchcock taught chemistry for the next 19 years at Amherst. His guiding principles for doing experiments were the following rules he put on the walls of his laboratory: "1. Never attempt an experiment in public which you have not within a few hours performed in private. 2. No apology to be ever given or received by any one in the laboratory for a failure, but it is to be set down as detracting so much from the skill of the operator." [131] The scientific resources of Amherst were minimal during its first few years, and Hitchcock often had to use his own money to procure "the apparatus, models and specimens."[132]

While Hitchcock credited the physical exercise done while researching natural history for aiding his health, he still obsessed over diet and sickness-related matters

---

[130] Hitchcock, *Reminiscences*, 287-288.

[131] Ibid., 288.

[132] Ibid., 291.

during the late 1820s. As a part of this, he became a passionate advocate for the growing temperance movement. He compiled a series of lectures on diet and health that he gave to students at Amherst into a book titled *Dyspepsia Forestalled and Resisted* in 1830. In this work, Hitchcock advocated a strict regimen of diet, with alcohol, tobacco, or opium in any form strictly forbidden except as prescribed by a physician, and the consumption of too much "stimulating" food, even meat, discouraged. He advocated that people weigh their food to get a proper sense of how much they consumed.[133] One section of the work that details Hitchcock's fierce opposition to alcohol shows tropes common to many of Hitchcock's works. He attempted to address a polemical issue using every possible combination of factors and listing many different ways to address the subject at hand. In the *Essay on Temperance*, he attempted to persuade youth to abstain from alcohol, tobacco and opium from four different perspectives: Philosophy (science); Self- Interest and Prudence; Patriotism; and Christianity. He thus argued that the substances under discussion are objectionable in four different ways, and that the cumulative effect of these objections rendered these substances utterly anathema.

In the Philosophy section, he used current medical research to demonstrate that the substances are technically poisons. He also cited various authorities to prove that the substances are not useful to various professions, such as soldiers and sailors. Therefore, they "must be very dangerous, when employed as articles of luxury or diet; or when

[133] For an amusing account of a woman of dyspeptic tendencies' attempt to recreate Hitchcock's recommended diet, see Nancy Pick, "Recipes for Dyspepsia," *Gastronomica: The Journal of Food and Culture* 5, no. 2 (Spring 2005): 19-22.

administered as medicines except under the direction of the regular physician."[134] He then mustered evidence that pure water is the ideal beverage for humans. The Self-Interest section is devoted to showing that the strength of the temperance movement and societal repugnance against stimulating substances will make even a moderate indulger unpopular. Also, drunkards will "lean on him as a support against the reproaches of conscience and the contempt of the world."[135] Students, in particular, should note the example of literary men ruined by intemperance, such as Robert Burns. The Patriotism section enumerates statistics about the cost to the United States in lost wages, crimes, and accidents due to alcohol, and claims that it adds up to at least $100 million. Hitchcock added that the existence of public drinking places causes men to separate from refined women. This separation "will create a relish for those grosser public amusements…whose prevalence always indicates a diseased and sinking state of society. He must be a blind man, who has not seen for some time past, a rapid progress in this country, towards such a condition."[136] Finally, alcohol was a useful tool of demagogues for gaining popular support, and thus alcohol "threatens our liberties with ruin."[137]

In the last section, dealing with religious arguments for temperance, Hitchcock faced perhaps the greatest difficulty. The Old Testament permits the use of wine, and New Testament figures used it as well. Hitchcock claimed that American wine is not the "pure juice of the grape, which is the common wine of Judea" but is rather adulterated

---

[134] Hitchcock, *An Essay on Temperance, Addressed Particularly to Students and the Young Men of America*, 2d ed. (Amherst: J. S. and C. Adams), 7.

[135] Ibid., 24.

[136] Ibid., 30.

[137] Ibid., 31.

with many unpleasant ingredients. He further claimed that the United States is a "cider country" since apples are common in it, and that (nonalcoholic) cider is the functional equivalent of wine in the United States. "The example of Christ and Paul, therefore, if it authorizes the use of wine in wine countries, merely authorizes cider in cider countries…[138]" Hitchcock certainly seemed to be stretching here, using any argument possible to deny the fact that the Scriptures he held so dear have no problem with wine as such. Hitchcock concluded his work by appealing to the Biblical imperatives to avoid temptation and follow the Golden Rule. Drinking alcohol predisposed one to temptations, and supporting the production of alcohol is in effect subsidizing drunkenness, which supposedly violated the Golden Rule.

A review of Hitchcock's whole work on dyspepsy by the (Unitarian) *Christian Examiner* agreed with the need to abstain from all ardent spirit (such as whiskey and rum). However, the journal criticized his extreme approach to wine and tobacco and deemed some of his claims about their poisonous nature to be false.

> We are not advocating their use, we only wish to let it stand on its true and proper grounds, and to have no objections advanced, which cannot be thoroughly made out…The same general tone of exaggeration pervades the whole of that part of the work of Professor Hitchcock which relates to diet. His views are founded upon certain general and very important truths; but he carries all his doctrines to an unreasonable extent. He draws the reins too close…He would bring all men down too much to one uniform standard of living; and this standard he would fix at the lowest quantity and simplest quality. He has long been a dyspeptic himself, and seems disposed to measure the constitution of others by his own.[139]

Hitchcock was always staunchly loyal to the cause of temperance, but in

---

[138] Ibid., 34.

[139] Review of *Dyspepsia Forestalled and Resisted*, by Edward Hitchcock, *Christian Examiner and General Review* 9 (N.S. 4), no. 2 (Nov., 1830): 243.

Reminiscences, he admitted that some of his other dietary prescriptions might have been too harsh. "My system was rather rigid…[b]ut it needed modification to suit all cases. [W]eighing the food eaten…[was only] a means of showing a man how much he was in the habit of eating…[a]nd…I only went against the excessive use of meat."[140]

Hitchcock always tried to further the cause of temperance at Amherst. He helped found the Antivenenean Society ("anti-poison") at the school in 1830. "All the officers of Amherst College joined at once, together with 118 out of 208 undergraduates…But [temperance pledges were] violated…Hitchcock himself said that more than half of the cases of discipline in the college had resulted from the use of intoxicating beverages."[141] In *Reminscenses*, Hitchcock noted many cases in which he had passed up the offer of a drink in public. He took great pride in such incidents, for instance one involving the Prussian ambassador to Britain.[142] Quite possibly he made a show of this. Contrary to the fears of many that temperance would embarrass them in society, Hitchcock claimed that "I have been a decided gainer wherever I have fearlessly and openly practiced total abstinence when in wealthy and refined society. It has secured to me respect and confidence instead of insult and mortification, and so I think every one will find it who tries the experiment."[143]

Hitchcock's obsession with matters of health apart from diet continued to be displayed in his scholarly works. In 1827, he wrote an article for the *Christian Spectator*,

---

[140] Hitchcock, *Reminiscences*, 298.

[141] Fuess, *Amherst*, 106.

[142] Hitchcock, *Reminiscences*, 302-303.

[143] Hitchcock, *Reminiscences*, 304.

in which he described the effects nervous diseases had on religious experience. Hitchcock cited many medical authorities on the nature of these diseases, and how physiological problems relate to "mental extravagancies."[144] Hitchcock claimed that nervous diseases are connected to dyspepsia, and as in his work on temperance, that the best treatment is "well regulated excercise, in rigid temperance, and in freedom from violent emotions and restless passions."[145] He especially pleaded that the general public should have sympathy for hypochondriacs and dyspeptics. They should not make them a "mark for the shafts of wit and ridicule."[146] In the main body of the paper, he described the supposed devastating effects of these diseases on religious experience, probably from personal experience. Christians afflicted with nervous diseases seem to fall into a melancholy state and always feel themselves more faulty and sinful than they are. Attempts to think of Jesus and God only make matters worse:

> The thoughts will fly to every gloomy spot in the picture, and hold these in bold relief before the desponding season…the terrors of the Lord, his justice and holiness, and the threatening of the law, darken all the prospect and shut out the sweet light of the Gospel…If he thinks of the Spirit, it is not as a comforter, but as resisted and insulted by his heart, and departed forever.[147]

Those afflicted by nervous diseases also are afflicted by nightmares and their thoughts are so distracted as to make effective prayer virtually impossible. Hitchcock did

---

[144] Hitchcock, "Influence of Nervous Disorders upon Religious Experience," *Christian Spectator* 9 (N.S. 1), no. 4 (April 1827): 186.

[145] Ibid., 181.

[146] Ibid., 182.

[147] Ibid., 189.

not want his statements to be used as an excuse by the nonreligious or hypocrites for their lack of devotion. That having been said, he claimed that nervous diseases are very prevalent in modern society, and their effects on religious character equally widespread. He concludes with advice on diet modification, reducing one's workload, and (of course!) total abstinence from alcohol.

Hitchcock's friend and colleague Benjamin Silliman, upon reading his article, wrote him, in a tone of gentle sarcasm, that it was an "energetic description of weakness, and…[an] animated and bright picture of gloom and darkness…It was very well done, but it almost persuades me that I was only a borderer upon the domain of dyspepsia, and that I never penetrated into the heart of the empire" as Hitchcock clearly had.[148]

While Hitchcock's almost frenzied opposition to alcohol and obsession with diet may seem disturbed, it was common at the time. Mark Noll notes that "[t]he abuse of alcohol was no joke in a society where the expanding production of grain had far outstripped the ability of bulk transport to take harvests to market."[149] Fuess, in his history of Amherst, includes a paragraph on the national climate at the time:

> [It] was a period of intense moral and intellectual activity, when all sorts of isms were being advocated by all sorts of cranks…eager to remodel society overnight, tried to prohibit what they disliked, from the holding of slaves to the use of tobacco. It was, in fact, an Age of Reform,- of vegetarianism, spiritualism, transcendentalism, and phrenology, -when any theory, especially if it was new, could secure a hearing.[150]

---

[148] Silliman to Hitchcock, 1 June 1827, cited in George P. Fisher, *Life of Benjamin Silliman, M.D., LL.D., Late Professor of Chemistry, Mineralogy, and Geology in Yale College. Chiefly from his Manuscript Reminiscences, Diaries, and Correspondence*, vol. 2 (New York: Charles Scribner and Company, 1866), 139.

[149] Noll, *America's God*, 296.

[150] Fuess, *Amherst*, 98.

Hitchcock's fear of illness and death possibly reached a climax in his 1839 *A Wreath for the Tomb*. This work consists of a series of quotes from major Protestant thinkers and moralists on the constant nearness of death and the neccessity to repent and accept Jesus as savior before being damned. Hitchcock introduced it with an essay meant both to terrify and to comfort. He warned repeatedly of the danger of becoming engrossed in this-worldly pursuits, given "how often does the unexpected summons to depart, even from the midst of life, terminate [a preoccupied man's] delirious dream, and hurry him unprepared [unconverted] to give in his final account. Oh could the pit open her mouth, what a rush of wailing voices would be heard, testifying to this painful truth."[151]

In *A Wreath for the Tomb*, Hitchcock enumerated many different professions, from architecture to politics, and talked about their benefits and charms, and how these can fatally distract people from repentance and devotion to God. Hitchcock referenced this work many years later to defend his religious orthodoxy. An unidentified biblical literalist had read *The Religion of Geology* and thought Hitchcock might be a Unitarian and thus counseled him to beware of the state of his soul. In Hitchcock's draft response, he vehemently proclaimed that he defends the doctrines of the Reformation. "I could not now give up these views without discarding not only the Bible but geology also. I did not

---

[151] Hitchcock, *A Wreath for the Tomb: or, Extracts from Eminent Writers on Death and Eternity with an Introductory Essay and Sermon on Lessons Taught by Sickness* [book on-line] (Amherst: J.S. And C. Adams, 1839, accessed 8 October 2002); available from Library of Congress, American Memory, Sunday School Books: Shaping the Values of Youth in Nineteenth-Century America **http://memory.loc.gov/cgibin/query/r?ammem/svy:@field(DOCID+@lit(wrea6))** , 14.

consider The Religion of Geology a proper place to exhibit experimental religion. But if you will read…my Wreath for the Tomb which was republished in London you will find what are my personal feelings on this great subject."[152] *Wreath* was perhaps Hitchcock's most powerful testament to his beliefs in traditional Protestant doctrines.

A pertinent example of the type of argument used in *Wreath* is Hitchcock's exhortation to geologists, which he included along with many other professions. This may be his most passionate exhortation among all the other ones he gives, perhaps since it deals with his occupation. In addition, he may be unconsciously expressing fears about the religiously problematic aspects of his profession, as he did consciously in his 1822 letter to Silliman.

> Geological researches bring a man into almost constant intercourse with the most astonishing and sublime of nature's productions. Now he penetrates the deep and dark cavern, studded with sparry wonders and perhaps the charnel house of the antediluvian world. Now he urges his way through the rugged mountain gorge, where over his head hang the jutting rocks, just ready apparently to crush him. Anon he climbs the lofty precipices; and as he looks down into the yawning gulf beneath, what creeping of nerves, what thrilling emotions of wonder and sublimity does he experience!…Does he open the solid rocks? What amazing records of past existence and of God's vast plans are brought to view! In short, he is everywhere in inevitable contact with the most unequivocal displays of God which creation can furnish. And yet to the God of the bible; to the Father of our Lord Jesus Christ, he may be an utter stranger…[H]e may have no complacency in the moral character of God; he may never have learnt that by nature he is an enemy of that God; and transforming grace may never have subdued his proud will, and given him that new heart without which he cannot see the kingdom of God. In short, he has never learnt to live to the glory of God, and therefore has made no preparation to die. It may be that when the thought of death comes over him, he has some indistinct apprehension that all is not right between his soul and God, and some faint resolutions of amendment are excited; but his pursuits are too engrossing to permit their immediate execution. Some new fossil must first be described, or some interesting district of country explored. Before

[152] Hitchcock's draft reply to an unidentified reviewer of *The Religion of Geology*, 15 June 1857, Hitchcock mss.

> these objects are accomplished, others equally attractive are brought before the mind, and the period of fancied reformation is crowded farther and farther onward, until it is pushed into eternity; where the voice of inspiration declares, there is no work, nor device, not knowledge. Ah, deluded man! what an aggravation of your future misery will it be, to have seen so much of God in his works on earth![153]

This paragraph sums up the essential combination of vocations and temperaments which describe Hitchcock-religion, rationality, and romanticism. He was at once a thundering preacher constantly exhorting students and parishioners to repentance and new birth in Jesus; a romantic nature lover who grew almost giddy with scenic beauty; a sober scientific scholar; and a death-afraid and morbid hypochondriac. Perhaps in early 19th century New England, these were not overly incongruous, but Hitchcock's intensity on each of these fronts was fairly unique even then.

Hitchcock's constant health complaints notwithstanding, he was able to accomplish an immense amount of pioneering work during the two decades between the beginning of his professorship and his appointment as Amherst president in 1845. During the 1830s, two major geological and paleontological matters occupied Hitchcock's attention. The first was his extensive geological survey of Massachusetts; the second was his research on fossil footprints, through which he essentially founded the field of paleoichnology.

There had been a preliminary state survey done in North Carolina in 1824-5, but "it was so lacking in breadth of conception and failed so utterly in execution that it is

[153] Hitchcock, *Wreath*, 37-38.

only by courtesy that it can be considered as a *geological* survey."[154] In 1830, the government of Massachusetts authorized a geographical survey of the state. Hearing of this, Hitchcock addressed Governor Levi Lincoln, "urging the importance of connecting with it [the general survey] a geological survey."[155] The governor agreed, and commissioned Hitchcock to perform this survey. Hitchcock accepted, on condition that he could continue to teach at Amherst while executing his work.

Hitchcock's report went through several editions and changes of form over the next 11 years. At first, he published a 72 page report on the economic geology of Massachusetts in 1832. In 1833, he published a much more elaborate 702 page report. This included four sections: 1) an expanded version of the economic report; 2)a section on "Topographical Geology," which was a description of the state's beautiful scenery and contained much romantic rhapsodizing and digressions on the happy moral state of the people of Massachusetts; 3) "Scientific Geology," a study of the different layers of strata and fossils to be found in the state. This included some speculations on the cause of gravel fields and large rocks seemingly out of place, and their connection to a primeval Deluge.[156] The fourth section was a catalog of flora and fauna of the state, which were submitted to Hitchcock by several naturalists. All together, this report "brought to a conclusion the first survey of an entire state at public expense."[157]

---

[154] George P. Merrill, *The First One Hundred Years of American Geology* (New Haven: Yale University Press, 1924; reprint, New York: Hafner Publishing Company, Inc, 1964), 143.

[155] Hitchcock, *Reminiscences*, 364.

[156] These will be referenced in Chapter 4.

[157] Merrill, *First One Hundred Years of American Geology*, 143.

Hitchcock continued to revise and expand the survey after its initial publication. He published a second edition in 1835, with extensive revisions of the flora and fauna catalog by the naturalists. Hitchcock was then commissioned by the government of New York to work on a part of their new geological survey, but he soon gave this up. "[R]eflection and a poor state of health led me to resign my post. I confess, also, that I had some hope that Massachusetts might yet call me again into the field, to review and carry forward the survey there, and in this I was not disappointed."[158] At Hitchcock's request, Massachusetts governor Edward Everett commissioned Hitchcock to revise the survey through further exploration of the state.

From 1837 to 1841, Hitchcock worked intensively on completing this survey, which was eventually titled the *Final Report on the Geology of Massachusetts*. This report left out the catalog of animals and plants, and added a fourth section on "Elementary Geology," setting forth basic principles of the subject.

In the introduction to the 1841 *Final Report* Hitchcock outlined the purposes of its four sections. The section on Economical Geology contained "a description of all the minerals and rocks in the State hitherto discovered, that have been applied to useful purposes."[159] The purpose of the Scenographical Geology section was to call "the attention of our citizens to striking features in our scenery, that are now generally passing unnoticed…if I succeed in [this], I shall feel as if an important point were gained."[160] The

---

[158] Hitchcock, *Reminiscences*, 365.

[159] Hitchcock, *Final Report on the Geology of Massachusetts* (Amherst: J.S. & C. Adams, 1841), iii.

[160] Ibid., loc. cit.

(theoretical) Scientific Geology section dealt with "the bearings of the subject upon the principles of the science, without direct reference to practical utility: although the theoretical principles have an important relation to practical utility."[161] It appears that given the emphasis on applied science in antebellum America, he was attempting to justify the inclusion of the Scientific section. Finally, the Elementary Geology section covers basic principles of geology for those "who have not the leisure or the means of consulting the larger works that have been published on the subject. My chief fear is, that I have been obliged, for want of room, to condense it so much as to make it obscure."[162]

Hitchcock would later expand this section into a separate book, *Elementary Geology*, the first college-level text dealing systematically with geology written entirely in America. It went through more than thirty editions and was often revised.

Hitchcock closed the introduction to the Report with a strange combination of piety and morbid anticipation of his death. "I desire to acknowledge and feel my supreme obligations to that kind Providence…To Him, therefore I desire to consecrate the fruits of this labor, and the little remnant of life that remain [sic] to me; in the humble hope that they may be accepted; and that upon a retrospect of my days, I may feel that I have not lived entirely in vain."[163] Hitchcock would live for more than thirty years after he wrote this declaration.

Hitchcock exhibited the qualities of a Romantic naturalist in the section on

---

[161] Ibid., loc. cit.

[162] Ibid., loc. cit.

[163] Ibid., iv.

Scenographic Geology. He quite often cited poetry here, and employed a liberal number of exclamation marks. He repeated the terms "romantic," "beauty," and "sublimity" quite often. His main purpose in this section was "to call the attention of men of intelligence and taste, to those striking features of our scenery, that are the result chiefly of geological changes, and which produce landscapes abounding in beauty and sublimity."[164] Hitchcock's Romanticism was of a somewhat different type from that of German *Naturphilosophen* and idealist philosophers of whom the term is often used. They tried to discover a union of forces in the universe, and opposed the reductionist tendencies of the Enlightenment. This tendency helped in the discovery of electromagnetism Hitchcock insisted that his scientific convictions were based on uncontrovertible facts, not idealist philosophy. As a good Baconian, regarded the German idealists' hypothesizing as well nigh insane. Hitchcock was an Anglo-Saxon Orthodox Protestant Romantic. He was recognizably Romantic in his love for wild nature and strange, ancient things such as prehistoric reptiles. Indeed, geology was often see as the quintessential Romantic science in this time period, taking researchers into nature and vistas of primeval time. In addition, Hitchcock's regard for nature as morally pure compared to the corrupting effects of civilization places him in the Romantic camp.

Ever the moralist, Hitchcock suggested that "many of our citizens, in their excursions for relaxation and health, instead of following the beaten track to places of fashionable resort, where more is often lost in morals than is gained in health, may be induced to climb our own mountains, and traverse our own deep glens and gorges, where they will find unsophisticated nature, with the dress given her by her Creator, scarcely

[164] Ibid., 228.

marred by the hand of man."[165]

It was common for moral reformers at the time to attempt to divert the general public from "sinful" diversions (saloons, bowling, theater, etc.) to innocent ones, especially the study of natural history. Natural history, by leading to evidence for a benevolent God, was also supposed to make the masses realize the importance of a stratified society with each class in its Divinely ordained place. While ordinary citizens might derive pleasure from beautiful scenery, Hitchcock argued that geologists get an even deeper appreciation of the land:

> [T]he mind of the [geologist] is stimulated and regaled by numerous rich and delightful associations. It is carried back through immense periods of past time, during which natural causes were operating to produce the scenery before him: and he witnesses in imagination that spot, assuming peculiar and widely diverse aspects; and sees how wisely each change was adapted to bring it into its present state. It may be too, that his mind reaches forward into futurity; and perceives other changes passing over the spot, no less interesting; and the neccessary consequence of the unalterable laws which God has established.[166]

Hitchcock had a rather unusual preoccupation with some of the mountains of Massachusetts. He regarded their titles as "uncouth and vulgar names!"[167] In particular, he objected to the names of Saddle Mountain, Rattle Snake Hill, Bear Town Mountain, Mount Toby, Mount Tom, and Sugar Loaf. In the *Final Report*, he notes that he preferred Indian names like "Taconic, Hoosac, and Wachusett…"[168] With a note of dry wit, he complains "[W]hat mountain can ever become an object of much regard and attachment, if its beauties and sublimities cannot be introduced into a nation's poetry, without

---

[165] Ibid., loc. cit.

[166] Ibid., 229.

[167] Ibid., 249.

[168] Ibid., loc.cit.

producing the most ridiculous associations! Fortunately there are some summits in the State yet unnamed. It is to be hoped that men of taste, will see to it, that neither Tom, nor Toby, nor Bears, nor Rattle Snakes, nor Sugar Loaves, shall be *Saddled* upon them"[169] Later, Hitchcock actually tried to rename Mount Toby Mettawompe, but the new name did not succeed and annoyed "local opinion"[170] Fuess describes Hitchcock's penchant for renaming as "almost a mania…"[171]

Before leaving the *Final Report* for the present, one more citation seems appropriate. It is taken from Hitchcock's description of the view from the Boston State House and gives insight into Hitchcock's political and social views.

> The political and moral considerations which irresistibly force themselves on the mind when contemplating such a scene [Boston and environs], cannot fail to increase the pleasure of the observer…how refreshing to the benevolent spirit, as it surveys from this eminence the dwellings of 150,000 human beings, to be assured that there is not a slave among them all; and that could the eye take in every part of the Commonwealth, it would read on every door post the inscription, 'all men are born free and equal;' a maxim which exerts a talismanic influence in defending the feeblest inmate against oppression…it is not licentious liberty that is here enjoyed; but liberty guarded by law, and sustained by law: and that it is the general prevalence of knowledge and virtue in the community, that renders it possible to sustain a proper balance between liberty and law… [S]o long as intelligence and moral principle predominate in the community, the ark of liberty is safe. At any rate, it is certain that we do now enjoy the blessings of freedom, and the means, widely diffused, of intellectual, moral, and religious cultivation. As a consequence, contentment, competence, and happines, are found even among the lowest classes in the community…[I]nstead of indulging in gloomy predictions of the downfall of liberty, let every man strive to form and retain that intellectual, moral, and religious character, which is its only effectual support. But I fear that I am

---

[169] Ibid., loc.cit, italics Hitchcock's.

[170] Fuess, *Amherst*, 129.

[171] Ibid., 128.

wandering beyond my appropriate sphere, by these remarks.[172] **[!!]**

Note again the combination of romantic appreciation of landscapes and rational calculation on the subject of what factors sustain liberty (religion being among the main factors).

During Hitchcock's work on the geological surveys, he began the study of fossil footprints, which would both be his most important contribution to paleontology and the source of his most acrimonious professional dispute. In 1835, Dr. James Deane of Greenfield, Massachusetts, sent Hitchcock casts of some fossil tracks which looked like the footprints of large birds. Intrigued, Hitchcock bought the original tracks from Deane. He noted that the tracks were found in a layer of sandstone. [This layer is currently dated to have been deposited during the Triassic and Jurassic Periods of geological time.] Even though the current names for geological periods were not fully established in Hitchcock's time, the general geological column of successive rock layers had been worked out. Thus, Hitchcock was able to note that these were the earliest traces of birds in the fossil record. Additionally, some of the tracks were "almost incredibly large."[173]

Hitchcock attempted to discern the different types of prehistoric birds which left these tracks. In his first paper on the subject, he noted several important facts about the footprints. They were not isolated, in many cases; often, "tracks succeed each other in such a direction, and with so nearly equal intervals, that it is impossible to doubt that they

---

[172] Hitchcock, *Final Report*, 267-268.

[173] Hitchcock, "Ornithichnology—Description of the Foot marks of Birds, (Ornithichnites) on new Red Sandstone in Massachusetts," *American Journal of Science* 29, no. 2 (January 1836): 308.

resulted from the continuous steps of an animal."[174] In addition, the tracks consisted of only one row of two successive prints, showing that the animals which made them were bipedal. Hitchcock concluded from this that "[t]hey could not have been made by any other *known biped*, except birds…they correspond very well with the tracks of birds."[175]

Hitchcock gave comparative illustrations between the fossil tracks and those of contemporary birds such as geese and turkeys. Recognizing that the study of fossil footprints was an almost completely new discipline, Hitchcock proposed terms for dealing with these tracks. The discipline was to be called *Ornithichnology*, the study of *Ornithichnites*, or stony bird tracks. Hitchcock divided the tracks into two types, *Pachydactyli* (thick toed) and *Leptodactyli* (narrow toed). He recognized the difficulty in classifying species based only on their footprints, without any body fossils to draw on, but nonetheless made an attempt to so classify. "Is it not…presumptuous to speak of distinct species when we have nothing but a mere impression of the foot?…But if we take into account the size and form of the track, and the distance between the successive steps, I am confident we can distinguish, often between those birds that were considerably unlike one another."[176] Some of the footprints were so large that it was difficult to believe their avian nature. "…the impression made on the mud appears to have been almost as deep, indicating a pressure almost as great, as if an Elephant had passed over it. I could not persuade myself, until the evidence became perfectly irresistible, that I was

---

[174] Ibid., 311.

[175] Ibid., 313, italics mine. The tracks were in fact made by varieties of carnivorous dinosaurs, a type of biped unknown to Hitchcock at this point.

[176] Ibid., 316.

examining merely the track of a bird."[177] The footprints were distinct from current birds, to the extent that "[t]he idea, that they belonged to existing species, can be indulged only by those unacquainted with the history of organic remains."[178] That having been said, it appeared, he decided, that they most closely resembled the prints of certain current wading birds. One of Hitchcock's particularly striking illustrations here was a comparison of the relative sizes of the tracks (Figure 1).

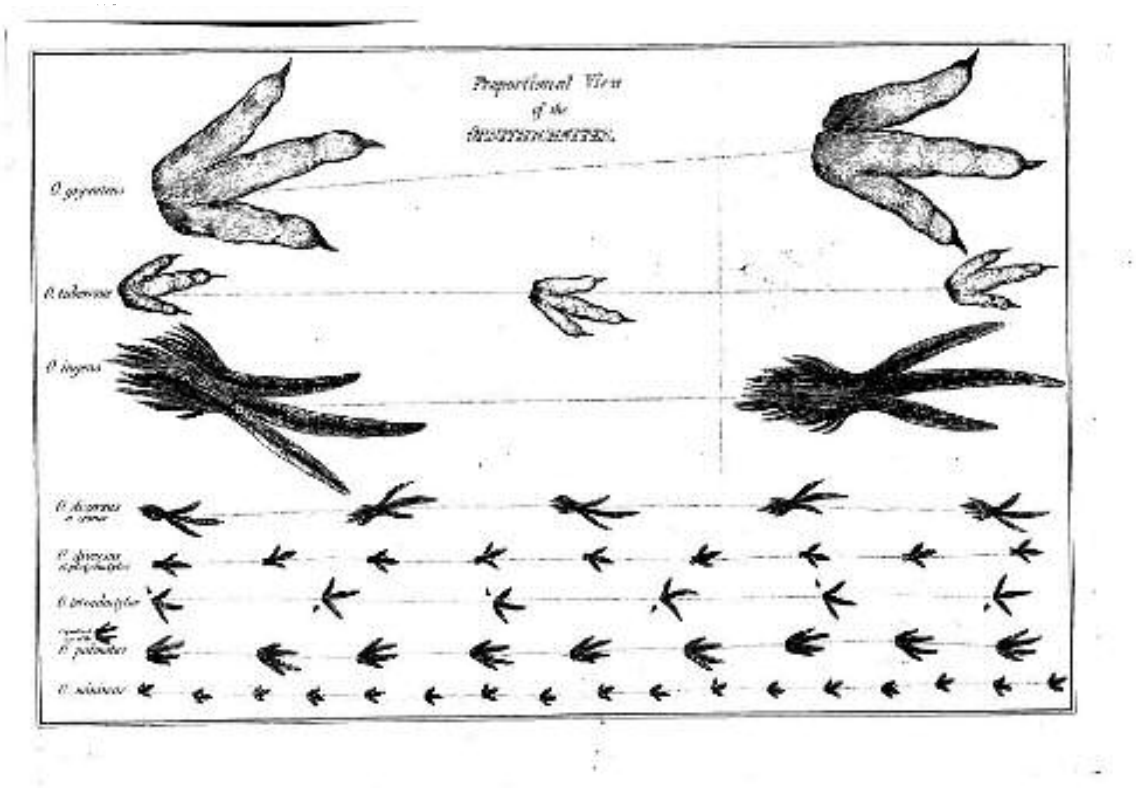

Figure 1. Hitchcock's proportional drawing of fossil footprints. From *American Journal of Science* 29, no. 2 (January 1836): 402.

The other fossils in the strata in which the prints were deposited were generally of marine life. Therefore, Hitchcock concluded that the bird tracks must have been

[177] Ibid., 319.

[178] Ibid., 327.

deposited in an estuary, or an environment on the edge of an ocean. These tracks would have been covered with mud gradually, and thus preserved for ages. "The quiet waters above them would be their security."[179] He attributed the birds' unusually large size to "[t]he much higher temperature that then prevailed, [which] seems to have been favorable to a giant like development of every form of life."[180] Hitchcock concluded this first ichnological article with assurance that he had not mistaken these footprints for any naturally occurring structure. Just before the end of the article, he put in a reference to the immensity of geological time and its reconciliation with the Bible, which showed his acceptance of "gap" theory:

> The number of years that have since elapsed, we cannot even conjecture; for, in respect to all the races of animals and plants that have occupied the globe, previous to the existing tribes, the scriptures are silent, giving us to understand merely, that a period of indefinite duration intervened, between "the beginning" and the creation of man; and geological monuments, although they clearly point out successive epochs in the natural history of the globe, yet furnish us with few chronological dates.[181]

Even in his most technical and scientific papers, Hitchcock often inserted references to God and the reconciliation of science with religion, although he tended to omit passionately Christological references from these.

The purchase of the first few footprint specimens from Dr. Deane marked the beginning of Hitchcock's immense track collection. This collection numbered over 8,000 specimens by the time of his death. At the time Hitchcock wrote this article on the tracks, he also wrote and published a romantic poem in which a sorceress summons up a huge

---

[179] Ibid., 336

[180] Ibid., 333.

[181] Ibid., 337.

prehistoric bird from geological strata. The bird laments the fact that such a puny being as man dominates nature, and that the world is so cold in temperature at the present.[182] Such concurrent authorship of technical articles and poems about the same subject is typical of the field of natural history before its full differentiation into professional geology, biology, and so on. Ironically, Hitchcock would play a vital role in that professionalization.

Between 1837 and 1843, Hitchcock became increasingly involved with the professionalization of the American scientific community. Hitchcock had been a member of fledgling geological societies in the 1810s and 1820s, but they did not last long. During his tenure as Massachusetts state geologist, he contacted fellow geologists Henry Darwin Rogers and James G. Percival about the possibility of having a general meeting of American geologists. He felt "the need of such a meeting more than almost any other rock breaker in the country because I am more insulated."[183] Amherst, being in rural Massachusetts, was somewhat removed from the main academic centers of the country. Many state geological surveys were conducted following Hitchcock's pioneering Massachusetts survey. "It was a critical time to establish uniform nomenclature and classification standards."[184] Hitchcock continued asking for a general meeting somewhat impatiently for several years. Finally, in 1840, Hitchcock, together with Rogers and

---

[182] For a reprint and analysis of the poem, see Jordan D. Marché II, "Edward Hitchcock's Poem, *The Sandstone Bird* (1836)," *Earth Sciences History* 10, no. 6 (1991): 5-8.

[183] Hitchcock to James G. Percival, 10 April 1838, quoted in Gloria Robinson, "Edward Hitchcock," 61.

[184] Kohlstedt, *The Formation of the American Scientific Community*, 66. Kohlstedt offers a detailed overview of the Association of American Geologists and Naturalists and its development into the AAAS.

other geologists generally involved in state surveys, met in Philadelphia. There, they resolved to found an Association of American Geologists, with Hitchcock as its first President.

At first, membership was restricted to geologists, but Hitchcock wanted to extend the Association's purview. "We began in fact to cherish the hope that the Association might gradually and quietly expand so as to embrace all the sciences, and so become an American association for the advancement of science, and so our proceedings were modelled after the great European associations of this kind" such as the British Association for the Advancement of Science, the Royal Society of London, and the Paris Academy of Sciences.[185] Accordingly, the organization was renamed the Association of American Geologists and Naturalists in 1842, and opened to the general scientific community. On retiring as President of the Association in 1841, Hitchcock gave an address in which several familiar themes in his thought can be discerned. He discussed the progress of geology in the United States, and broached the subject of glaciers rather than the Deluge as a cause of the moraines and erratic boulders in the Northeast. He also referenced the sublime aspects of geology yet again, in marveling at the progress made in geological science in the country.

> …I am astonished and delighted at the progress of American geology, and it seems to me more like a dream than the reality. Only twenty five years ago…all was darkness and perplexity. A geologist was as rare as an oasis amid the sands of Africa; and to be seen accoutred geologically, with hammer and knapsack, would subject one to ridicule, if not a suspicion of insanity. But how changed the scene! From the top to the bottom of the series, the principal groups of our rocks seem now to be nearly…identified. And as the rapid rise and developement [sic] of this great nation is a spectacle of deep interest and *sublimity, so our geologists find a correspondent grandeur in our rock formations*. Now too, nearly all the

[185] Hitchcock, *Reminiscenses*, 369.

> state governments of this country extend their patronage to geological researches; lectures upon geology are demanded and given in all our larger towns; and the wonders of this science form the theme of discussion in the drawing-rooms of taste and fashion.[186]

The use of the term "sublime" and references to the wonders of geology further substantiate the description of Hitchcock as a Romantic. Indeed, later in the address, he paraphrased the description of geological exploration he gave in *A Wreath for the Tomb*, although he left out the material on the neccessity of being born again to be saved. Here, he confined himself to descriptions of God's glory, plans, and benevolence illustrated from His works.

In the Association's Transactions during its first three years of existence, Hitchcock published four articles. One was on the question of glacial action in creating the Drift (formerly Diluvium) formation in America, which consisted of moraines and erratic boulders. Hitchcock now had developed his fourth view of Noah's flood, which was that it was confined to the ancient Near East and irrelevant to American geology. Two articles dealt with new fossils found in New England, especially fossil footprints, and a fourth was on the geology of Western Asia. Hitchcock was beginning to think that some of the fossil footprints were made by unknown types of animals similar to birds. He would get extremely close to identifying them correctly as those of bipedal dinosaurs without finally making the connection. Characteristic science-religion motifs of Hitchcock's also show up in his article on Western Asian geology. As Western Asia includes what is now termed the Middle East, Hitchcock speculated in one place on whether volcanic activity caused the destruction of Sodom and Gomorrah. After

---

[186] Hitchcock, "First Anniversary Address before the Association of American Geologists," *American Journal of Science* 41, no. 2 (July-Sept. 1841): 271, italics mine.

extensive analysis of the geology and topology of the Dead Sea area, he concluded with a reassurance that he was not denying the miraculous nature of what had happened.

> I have inquired simply what was the agency employed by the Deity to accomplish this purpose. We know that He does not unnecessarily contravene the laws of nature, but employs natural operations, even for the accomplishment of what we might call a miracle. As to the destruction of these cities, the sacred narrative does not decide whether it was done miraculously, or otherwise. It does, indeed, impute it to the direct agency of God; but this is the manner in which every natural event is spoken of in the Bible. Hence, we are at liberty to regard that catastrophe as natural or miraculous, according as we can or cannot explain it by natural means.[187]

To Hitchcock, as to many of his contemporaries, the Book of God's Word and the Book of God's Works (nature) were ultimately from the same author, and God's will was proclaimed through naturalistic events as much as through open miracles.

Hitchcock continued his membership in the Association after stepping down as President. By 1847, the Association's members decided to further broaden its potential for organizing American science, and in 1848 renamed it the American Association for the Advancement of Science. This was certainly an indication of modernization. The term "science," denoting the study of the natural world was finally replacing the older term "natural philosophy." (Contrast the name of the AAAS with the older American Philosophical Society, for instance). As early as 1843, Hitchcock began to be left behind by the rapid professionalization and growth of the organization. As Kohlstedt suggests, "He had been prime mover for an organization which moved rapidly beyond him; his

---

[187] "Notes on the Geology of several parts of Western Asia; founded chiefly on Specimens and Descriptions from American Missionaries," in *Reports of the First, Second, and Third Meetings of the Association of American Geologists and Naturalists, at Philadelphia, in 1840 and 1841, and at Boston in 1842, Embracing its Proceedings and Transactions*, by the Association (Boston: Gould, Kendall, & Lincoln, 1843; reprint, New York: Arno Press, 1978), 379.

continued interest in 'curiosities,' while acceptable in small, local societies, was not relevant to the new practicing geologists. Hitchcock's stature and eminence precluded any atttempt to silence him, and his less relevant presentations were simply bypassed; his work on geology continued to be respected." [188]

Looking back from 1863, Hitchcock was proud of what the AAAS had accomplished, but he was annoyed and even hurt by its disregard for its predecessor, the AAGN. The published proceedings of the AAAS had indicated that it was founded in 1848. The existence and members of the AAGN were given scant notice in the first proceedings, and then none. His lament seems to suggest the phasing out of talented amateurs in the field of science. Hitchcock would have felt this particularly keenly, as he had been mocked in the press on some occasions for his lack of nonhonorary college degrees.[189]

> [W]as it generous, was it just, thus to endeavor to cover up these eight years of the successful labors of [the AAGN], and to convey the impression that nothing worthy the name [sic] existed prior to 1848-as if ashamed of its parentage. For it is certainly true, however homely our labors, that we did succeed in accomplishing what the men who are supposed to stand at the head of American Science did not dare attempt, viz: to establish and bring into full operation the [AAAS]…So palpable is the injustice that if I had not felt such a strong aversion to introduce a subject into the Association that would have awakened discusssion and alienation, I certainly should have done it. For I do not believe that the Association, as a body, would ever sanction such a course. But let it pass now: I must do so. Yet history will place the whole transaction in its true light, on her impartial tablet, and full justice will then be awarded to the [AAGN].[190]

---

[188] Kohlstedt, *Formation of the American Scientific Community*, 71-72.

[189] For an example of such mockery, see "Ornithichnology," *Knickerbocker* 7, no. 6 (June 1836): 578-582, Hitchcock's reply, "Ornithichnology defended," *Knickerbocker* 8, no. 3 (September 1836): 289-295, and his anonymous antagonist's rejoinder, "Ornithichnology Reconsidered," *Knickerbocker* 8, no. 4 (October 1836): 456-458.

[190] Hitchcock, *Reminiscenses*, 373.

Hitchcock's work on the geological surveys, the footprints, and the AAGN had earned him the respect of the American scientific community. However, in 1843, a major controversy in his career began, which for the rest of his life "left lasting prejudices in some minds against me, and a feeling as if I had claimed what did not belong to me."[191] The controversy consisted of a dispute regarding the priority of discovery of the fossil footprints Hitchcock had described. Clearly, Dr. James Deane had called Hitchcock's attention to the existence of the prints in 1836. That established, Hitchcock and Deane had a bitter falling out over who first recognized the *significance* of the prints (i.e. that they were definitely the footprints of birds and/or birdlike bipedal reptiles and not plants or random striations).

Hitchcock's growing ichnological collection and consequent fame[192] apparently aroused Deane's interest (and presumably jealousy). He began publishing papers on the fossil footprints in the *American Journal of Science* in 1843. The first paper consisted of Dr. Deane's correspondence with Dr. Gideon Mantell, a British paleontologist and discoverer of the dinosaur *Iguanodon* as well as a letter to Silliman (the journal's editor) from Professor Richard Owen, British anatomist, paleontologist and coiner of the term "dinosaur." The subject was whether the footprints were definitely made by large birds or by some other prehistoric creature. Ironically, the possibility of bipedal dinosaurs as

---

[191] Ibid., 374.

[192] For example, the preeminent British geologist Charles Lyell stopped in Amherst during his American travels in the spring of 1842 to visit Hitchcock. Hitchcock took him to see geological formations with footprints; for a complete account of Lyell's travels, see Leonard G. Wilson, *Lyell in America: Transatlantic Geology, 1841-1853* (Baltimore: Johns Hopkins University Press), especially 48, 94, 370-371 for his meetings with Hitchcock.

track makers was not discussed. The few dinosaurs which had been described by Mantell, Rev. William Buckland and others from fragmentary remains were assumed to be massive quadrupeds.

Owen's contribution to the debate over the footprints was his analysis of bones obtained from New Zealand, which turned out to be those of the giant extinct bird *Dinornis*, or the moa. This seemed to substantiate the idea of giant birds making the footprints. Deane also held that the footprints had been made by birds and not reptiles, and after some initial reluctance, Mantell agreed as well. The problematic part of the correspondence, which severely irritated Hitchcock, was Deane's contention that he alone had first identified the tracks as indubitably belonging to prehistoric birds. "Both [Hitchcock and Silliman] admitted the plausibility of my statements, yet remained incredulous as to inferences, ascribing the origin of these remains to accidental causes, and it was only after accurate models were transmitted to them, that the real truth was obvious."[193] Hitchcock viewed Deane's description as a blatant distortion of what had actually happened. He could not let it pass unanswered, especially as the prominent British geologist Roderick Murchison had recently described Deane as the "original discoverer" of the footprints in an address to the Geological Society of London.

Hitchcock replied to Deane in a new article to the *American Journal of Science*, based on a lecture which he read to the AAGN. The article gave a summary of the history of the emerging discipline of the study of fossil footprints. The discipline had changed names from Ornithichnology to Ichnolithology and most recently to simply

[193] James Deane et al. "Ornithichnites of the Connecticut River Sandstones and the *Dinornis* of New Zealand," *American Journal of Science* 45, no. 1 (April-June, 1843): 179.

Ichnology (coined by Buckland). Hitchcock gave the history of footprint discoveries in order to sort out the rightful discoverer of the true nature of the prints. He claimed that he did this "with great reluctance, not only because it is difficult to speak of one's own labors unexceptionably, but especially because I shall be brought into some apparent collision with Dr. Deane, between whom and myself there has existed to this time an uninterrupted friendship. But really I do not see how I can do justice to myself or to others, without detailing the facts."[194]

The facts, as Hitchcock saw them, were that other people besides Deane had noted the presence of strange footmark-like impressions on rocks in Massachusetts as early as 1802. Some had even recognized the resemblance of the tracks to those of "turkeys." In fact, Hitchcock noted, reproducing Deane's original letter of 1835, Deane himself *thought the prints were from a turkey* (albeit perhaps a prehistoric one). Hitchcock had indeed been skeptical at first as to whether the impressions were true footprints, but after investigating them, concluded that they were. Deane's opinion of the nature of the marks "made no impression upon me."[195] After the initial discovery, Hitchcock recounted, he had discovered many more tracks, and compared them with the tracks of living animals. All this "was commenced *alone*, and for years has been continued *alone*…If in any thing I can lay claim to originality and original discovery, it is

[194] Hitchcock, "Report on Ichnolithology, or Fossil Footmarks, with a Description of several New Species, and the Coprolites of Birds, from the valley of Connecticut River, and of a supposed Footmark from the valley of Hudson River," *American Journal of Science* 47, no. 2 (July-Sept. 1844): 297.

[195] Ibid., 299.

here."[196] Deane was the original discoverer only in a "popular sense," but only Hitchcock himself had investigated fossil footprints scientifically. Hitchcock allowed that Deane deserved considerable credit for noting the tracks, and was willing to "acquit him, and indeed all others, of doing me any intentional injustice in this matter-as I trust they will acquit me of a desire to claim more than my due."[197]

Turning to other matters, Hitchcock described new footprints in the remainder of the paper, and concluded with what appears to be a typical Hitchcock closing statement: romanticism mixed with moralism and religion. The footmarks teach two moral lessons: first, that human actions may similarly leave traces which will last for the equivalent of eternity (and that this should persuade people to be cautious about what acts they commit and what words they say, as these may be preserved on the air. On the other hand, the ephemeral nature of monuments to human ambition compared with the fossil footprints, teaches humility. Finally, "the solid strate reveal to [a geologist] the history of those ages, so near the birth of time, with all the distinctiveness of yesterday; and he finds the laws by which [God] governed the universe then, engraved, like those given at Sinai, upon tables of stone."[198]

Deane refused to concede the point; claims and counter-claims were published by the two over the summer and fall of 1844 in the *AJS*. Silliman was in somewhat of a bind, as he was the editor of the *American Journal of Science* and also a close friend of Hitchcock's. He "tried to give fair recognition to both men without hurting Hitchcock's

[196] Ibid., loc cit, italics Hitchcock's,

[197] Ibid., 301.

[198] Ibid., 322.

feelings."[199]

By the end of 1844, the controversy's intensity had subsided, but Hitchcock would continue to publish statements as to his rectitude in the matter for the rest of his life, even after Deane's death in 1858. But a more pressing matter was now occupying Hitchcock's attention. Amherst College, where he had been teaching during the founding of the AAGN and the Deane controversy, was in financial trouble. In addition, the student enrollment had declined precipitously, from "259 in 1836…to 121 in 1844."[200] The President, Heman Humphrey, had resigned, discouraged, in January 1844.[201] On December 16, 1844, Edward Hitchcock was offered the Presidency of Amherst College.

Amherst Presidency and Excursions (1845-1854)

Hitchcock records that he was of a divided mind about accepting the offer of the Presidency, according to *Reminiscences*. On the one hand, he gave six objections to assuming the office. First, "[m]y constitution, naturally timid and hesistating, and rendered morbidly so by more than thirty years of wretched health, was averse to governing men by strict…rules. If I could not control them by moral influence I had no disposition to force or command them."[202] Second, he had no ambition to be President. Third, he had a bad record on obtaining money from philanthropists, and Amherst badly

---

[199] Gloria Robinson, "Edward Hitchcock," 71.

[200] Fuess, *Amherst*, 124.

[201] Ibid., 126.

[202] Hitchcock, *Reminiscences*, 305.

needed funds. Fourth, he was afraid that his lack of a formal college education would, as President, "awaken a strong prejudice against the College in the literary community, instead of the favorable impression, which seemed indispensable."[203] Fifth, he knew that the labors inherent in the office of the Presidency would prevent him from accomplishing his life goal: the writing of a comprehensive work of natural theology. At the end of his life, he noted that "this has ever seemed to me the greatest sacrifice I was called on to make in accepting the office, and even now, I can scarcely think of it but with tears."[204] The inability to finish a work of comprehensive natural theology was "the great failure of my life."[205] Finally (and not surprisingly), he felt that his health was not nearly good enough to take on the Presidency.[206]

In contrast to these six objections, Hitchcock offered six reasons why he should accept the Presidency. First, he knew how to "work hard and to practice rigid economy."[207] Second, as he came from a poor background, and Amherst was founded to help poor young men study for the ministry, he could be of great help in counseling students of this type. Third, given his lack of a formal education, he could advise others of the importance of acquiring it. Fourth, as President, he would simultaneously assume

---

[203] Ibid., 306.

[204] Ibid., loc cit.

[205] Ibid., 295.

[206] For example, in 1842 he had a fever that brought on many vivid hallucinations, including a meeting with large women from Saturn (!) For a description, see Hitchcock, "Case of Optical Illusion in Sickness, with an Attempt to explain its Psychology," *New Englander* 3, Iss. 10 (April, 1845): 192-215.

[207] Hitchcock, *Reminiscences*, 307.

the office of a minister again, which he felt important to strengthen his spiritual life. Fifth, he had confidence in the judgment of the faculty and trustees to help him in getting Amherst out of debt and decline. Finally, since the best interests of Amherst outweighed his own, "I did not feel at liberty to to refuse to enter this field of labor, whose doors seemed to open so widely, and into which the finger of Providence seemed to point so plainly."[208] In the end, he accepted, and assumed office on April 14, 1845. Hitchcock's justifications for entering the Presidency seem slightly self-serving. The structure of his arguments in *Reminiscences* suggests that he tried to frame his position as a dilemma, by putting forth an equal number of arguments for and against his assuming the Presidency.

Hitchcock's inaugural address as President, "The Highest Use of Learning," encapsulated many of his prime concerns as educator, minister, and scientist. The address stated that "the religious applications of learning are by far its most important use…"[209] Hitchcock proceeded to survey various fields of "human learning" and point out the dangers and/or benefits they provided to religion. The area of classical Greek and Latin literature Hitchcock deemed vital, especially in order to read the New Testament in the original and understand its societal context. Ministers who did not know Greek would be more likely to make a mistake in Biblical interpretation, which could have infinite consequences for their parishioners.

In contrast, Hitchcock reserved a great deal of vitriol for the field of "Polite Literature," including history, poetry, and fiction. "[N]ot a little of the influence of modern polite literature has been very disastrous to religion…deeply imbued with

---

[208] Ibid., 309.

[209] Hitchcock, *The Highest Use of Learning* (Amherst: J.S. & C. Adams, 1845): 4.

immorality, or infidelity, or atheism. Yet the poison has been often so interwoven with those fascinations of style, or thought, characteristic of genius, as to be unnoticed by the youthful mind, delighted with smartness and brilliancy."[210] Hitchcock noted that history was less problematic nowadays, since the antireligious agenda of figures such as Gibbon had been exposed, and many historians were pro-Christianity. Poetry, which was "the natural handmaid of pure religion," had been perverted to licentious ends, and many poets were immoral. Horrifyingly, many poets advocated drinking alcohol. Modern drama was on the whole equally bad, and "even Shakspeare with all his splendid moral sentiments was undoubtedly a libertine in principle and practice."[211] Fortunately, there were a few wonderful religious poets, such as Milton and Watts.

The worst examples of literature were modern novels and romances. "To minds averse to close thinking; to those whose tastes and habits are all artificial, and who have never acquired a relish for the beauties and wonders of nature; as well as to those who are the slaves of appetite and passion; the novel and the romance have ever possessed irresistible attractions. And since, these three classes form…the principal part of society, this is the literature that is most widely and abundantly diffused."[212] These views were common in the reformist milieu of the time, if not always preached with Hitchcock's passion. Even the early *Scientific American* contained articles attesting to the dangers of novel-reading.

---

[210] Ibid., 8.

[211] Ibid., 9-10.

[212] Ibid., 12.

Hitchcock regarded the efforts of Christians to write religious novels as futile. Rather, he advocated tackling what he regarded as the root cause of the love of fiction: a love of novelty. This propensity should be enlisted in the service of religion by teaching people to appreciate the wonders of nature. Hitchcock often made speeches later in his career comparing the true wonders of nature (especially in geology and paleontology) with the fictitious and harmful "wonders" found in literature. This was the key to defeating the "morbid love of fiction…[t]o restore nature, therefore, to the throne of the heart, and expel the meretricious usurper, is the noble work that lies before the scholar of the nineteenth century…the heart which is alive to natures beauties [sic], is well prepared to love the God of nature, as well as the God of revelation."[213]

This is a key point in understanding Hitchcock's world view: his romanticism, so often displayed in his copious references to nature and the sublime, was subordinated to his ultimate goal of unifying science and religion. The goal of getting the masses to take nature hikes was not merely exercise and technical edification; it was to purify their minds to love God, and ultimately experience rebirth. Hitchcock often seemed to prefer being in the wilds of nature to experiencing the corruptions of civilized society, yet he was no Luddite; he lauded the technical progress seen in the invention of the telegraph and railroad.

Hitchcock now moved from describing literature to the field of philosophy. Philosophy consisted of two branches: intellectual and moral. Hitchcock claimed that moral philosophy, as well as politics were nothing more (ideally!) than the application of religious principles, and hence did not require much description. However, intellectual

[213] Ibid., 13.

and/or moral philosophy not based upon religious convictions was very dangerous to religion. He castigated the Church fathers and medieval thinkers for trying to synthesize Christianity with Platonism and Aristotelianism. Hitchcock thought that men should "receive with child-like confidence the declarations of the Bible, without reference to ontological systems…"[214] That having been said, Christian scholars should become familiar with philosophical systems, if only to be able to refute them.

It is important to discern what Hitchcock is and is not saying here. He thought that people should accept the moral and theological truths proclaimed in the Bible clearly, without reference to metaphysical systems (such as showed up in Medieval Scholasticism). This is yet another example of "Baconian" type theology, popular in the Anglo-American intellectual milieu at the time. The facts underpinning Christianity were to be derived from a plain, simple reading of the Bible, and were as evident as the unvarying "facts" of science. Hitchcock is *not* saying that science cannot help us understand the Bible; he only disqualifies metaphysical philosophy from providing exegesis. This is especially significant as it was only in the mid-1800s that terms such as "science" and "scientist" replaced the general term "natural philosopher." This dichotomy, between the presumed absolute facts of science and unreliable speculations, was very popular at the time. As David Hull notes, "In Darwin's day Aristotle was looked upon by scientists as the author of infinite error and Bacon as the man who fashioned the method which Newton was to use to unlock the mysteries of the universe."[215]

---

[214] Ibid., 16.

[215] Hull, *Darwin and His Critics*, 16.

Thus, it is no surprise that when Hitchcock shifted his survey from literature and philosophy to science, his rhetoric became far more positive. Mathematics, through the study of invariant laws of nature, "forms the very framework of nature's harmonies, and is essential to the argument for a God."[216] Mathematics, through the description of seemingly impossible phenomena such as hyperbolae and asymptotes (lines coming closer and closer without ever meeting) could help reconcile men's minds to the seemingly contradictory idea of the Three in One Trinity. His religious interpretations became even more extreme when it came to the "inductive sciences," which seem to mainly mean physics and astronomy. The "wonderful effects" of the physical sciences seemed to demand an ultimate cause, that being God. It is not just the physical sciences that exhibit this:

> [I]n truth, every fact of inductive science furnishes an argument for theism. So that to a man in a morally healthy state, every scientific truth becomes a religious truth, and nature is converted into one great temple, where sacred fire is always burning upon the altars, where hovers the glorious Shekinah [Hebrew word for the quasi-feminine presence of God], and where, from a full orchestra, the anthem of praise is ever ascending.[217]

This quote seems to sum up the essential views of Hitchcock, that ultimately, for a scholarly Christian, science is subsumed into religion. Hitchcock continued the speech by noting that some scientists had been nonreligious, but those tended to be ones who continued and applied the principles of original discoverers, who were generally religious, like Newton, Copernicus, and Boyle. Hitchcock then gave examples of science misinterpreted to attack religion, such as the controversy over Copernican astronomy and

---

[216] Hitchcock, *Highest Use of Learning*, 19.

[217] Ibid., 21.

the idea that the matter of the planet, having oxidized already, could not be destroyed in the Final Conflagration. These resulted, he said, from improper reading of the biblical text. When properly interpreted, there would be no contradiction; indeed, there was support for the inspired origin of the text.

Hitchcock then attacked other religions, such as Hinduism and Islam, for containing false science; evidently the Koran directly advocates a geocentric universe. In good religio-Baconian fashion, he claims that "so interwoven are these scientific errors with the religion of these sacred books, that when you have proved the former you have disproved the latter. But the Bible, stating only facts, and adopting no system of human philosophy, has ever stood, and ever shall stand, in sublime simplicity and undecaying strength."[218]

Hitchcock continued to show various illustrations of God's existence and benevolence from chemistry, anatomy and physiology. He briefly mentioned the fields of phrenology and mesmerism, noting that to whatever extent they were true, their tendency was antimaterialist and so not threatening. Then Hitchcock discussed one of the most problematic areas of science: proto-evolutionary theory. This had become a more pressing issue recently, since a controversial but popular work had been published the year before advocating evolution, *Vestiges of the Natural History of Creation*.[219]

---

[218] Ibid., 25.

[219] The work was anonymous, but later shown to be written by the Scottish publisher Robert Chambers. For a truly exhaustive and superb study of the readership of *Vestiges*, see James A. Secord, *Victorian Sensation: The Extraordinary Publication, Reception, and Secret Authorship of* Vestiges of the Natural History of Creation (Chicago: University of Chicago Press, 2000), Secord, in his only reference to Hitchcock, identifies him incorrectly as a Presbyterian.

Hitchcock claimed that evolutionary theory was false due to a) the lack of proved cases of spontaneous generation and b) the lack of an evolutionary process seen in the fossil record. The popularity and ingenuity of *Vestiges* showed that "a long drawn contest is yet before naturalists on these subjects, ere these fancies shall be forced into that extramundane receptacle of things abortive and unaccomplished, described by Milton as 'a limbo large and wide,' on the back side of the moon."[220] That having been said, Hitchcock believed that even if evolutionary theory were adopted by the scientific community, it would not displace the need for God to give laws to allow for evolutionary development. Thus, "I reject [evolutionary theories], more because they have no solid evidence in their favor, than because I fear that they will ultimately be of much injury to religion;"[221]

After this dismissal of evolution, Hitchcock climaxed his description of knowledge with the great aids geology provided to religion. It helped provide new arguments in favor of God's existence by showing 1) that there was a period in the fossil record when no life existed, so life did not exist eternally and must have been created; 2) the presence of mass extinctions demanded Divine agency to bring them about; 3) humans show up only recently in the fossil record, and as the highest form of life, must have been created by a Divine being. Geology also, by opening a window into the vastness of past time, shows Christians "a splendid panorama of the vast and varied plans of [God]…[and the] unity of the Divine plans"[222]

---

[220] Hitchcock, *Highest Use of Learning*, 31.

[221] Ibid., loc. cit.

[222] Ibid., 33.

Having concluded his survey of all of human knowledge, Hitchcock drew ten concluding inferences. 1) He claimed that it was a monstrous perversion of learning to consider it hostile to religion, as ignorant Christians sometimes did. 2) He thought that advocates of religion and of general learning should view each other as working for the same cause. 3) Ministers should see that teaching science and literature are intrinsically part of their work as ministers. 4) eminent scholars should ideally become more pious as their learning increases. 5) learning's contribution to religion gave "secular" scholarship great importance, since "religion without learning almost degenerates into fanaticism or dead formalism;"[223] 6) Patrons who founded literary institutions with religious aims in mind were honorable and influential, citing the namesakes of (originally) religious colleges such as Harvard and Yale. 7) Christian scholars had a vast task ahead of them: to render all human knowledge subservient to religion. 8) Every literary institution should promote religion in the course of instruction. While institutions should be open about their creeds, they should not make students' literary honors dependent on the acceptance of said creeds. 9) Professorships of natural theology are very important for religious colleges. Finally, the goal of making learning serve religion was integrally behind the foundation of many scientific and literary organizations, especially Amherst. These conclusions encapsulate the overall goals and aims of Hitchcock's nascent Presidency.

However, before these ideals could be realized, Amherst had to emerge from debt. Hitchcock devoted most of the rest of his inaugural speech to a discussion of means of increasing Amherst's finances, and reasons to be optimistic about its future. He concluded by suggesting that perhaps one reason for Amherst's troubles was a lessening

---

[223] Ibid., 35.

of trust in and dependence on God. He called on the faculty and students to "…let faith hold on firmly to the principle, that God will assuredly crown with success every sincere, effort [sic] to bind the wreath of learning around the brow of Religion, and cheerfully and resolutely shall we consecrate ourselves to the great work of sustaining and advancing this Institution."[224]

Hitchcock now began his tenure as President of Amherst. He proved to be "as successful at bringing in funds as he had been at discovering fossil footprints."[225] He persuaded several philanthropists to endow three new professorships. In his address on retiring from the Presidency in 1854, he noted, "And oh what a load did these benefactions take from my mind!…I began to hope that we might be saved."[226] In 1847, he successfully lobbied the Massachusetts government for funds. The Massachusetts legislature, by this time, included several Amherst graduates, who were on the committee which heard the petition. The committee "unanimously recommended the appropriation of $5000 annually for five successive years," which passed.[227] Amherst was now able to pay off its debts and allot funds to improve the facilities. The student population continually increased. "Only thirty-four freshmen entered in 1845; the entering class a decade later was fifty-four. In 1854, the undergraduates were recorded as 237."[228]

---

[224] Ibid., 51.

[225] Fuess, *Amherst*, 130.

[226] Hitchcock, *Address on Retiring from the Presidency* ([publisher unknown:1854?]), 55.

[227] Fuess, *Amherst*, 132.

[228] Ibid., 137.

Hitchcock, who had serious doubts about his ability to manage and salvage Amherst, had justified the trustees' confidence.

Even though often consumed with financial matters, Hitchcock continued to give classes on geology and natural theology, and preached a sermon in the College Chapel up to twice a week. Hitchcock's description of his correspondence when President provides a good sense of his varied interests. It seems to be representative of the scientific community in the days before professionalization fully took hold.

> I had previously been so much of a *jack at all trades* that I had laid myself open to inquiries and assaults from all classes. The same mail (and I hardly exaggerate the literal fact,) might bring inquiries about some point in the theory of temperance—how to employ garnet in making sand-paper—how to reconcile the imputation of Adam's sin with our sense of justice—where to find the best beds of sulphate of baryta—whether I would like to exchange or buy shells, minerals, and fossils—how cheaply an indigent young man can go through the college and with what helps—whether I know of any one who will make a good teacher of a common school, an academy, or a professor in a college—or any one to supply a pulpit—what I think of a new theory of [glacial] drift, or of latent heat—or new views of the relations of geology to Moses—or a new poem—or a new work—all of which are sent and an answer requested, if possible, by return mail…[229]

Hitchcock met with the Amherst faculty once a week, which proved stressful. The meetings often ran late, and the subject matter often dealt with the possible discipline or expulsion of a student. He was often exasperated by the student body's seemingly reflexive sympathy for offenders. Hitchcock had to contend with the growth of secret societies on campus. After consulting with nine other college presidents for their opinions, he decided to allow them to remain at Amherst.[230] He also had to deal with fierce competition among students for college honors, and the need to console those who

[229] Hitchcock, *Reminiscences*, 317, italics Hitchcock's.

[230] For details of the presidents' opinions, see *Reminiscences*, 322-325.

had failed to receive those honors. He tried to reassure these students of their abilities to become clergymen and missionaries. Lastly, he had to deal with the perennial problem of hazing of freshmen. He attributed this to two main factors: the popularity in society of collegiate stories dealing with freshman abuse, and the approval of the upperclassmen. In a typically moralistic fashion, he described a freshman who had contracted a fatal case of "consumption" from having his bed drenched by other students. The student, on his deathbed, reportedly forgave his abusers to Hitchcock.

Hitchcock's general approach to student discipline was relatively lenient. He viewed college discipline as being "neither strictly parental, nor entirely military, but a mixture of both, so as to be *sui generis*."[231] His policy was to consult first with student offenders. The administrators would encourage them to 1)leave Amherst if it was an unsuitable environment for them, without public disgrace; and 2)promise them that if they reformed, the officer in question would not reveal their offence to the faculty. Hitchcock based this lenient treatment on his interesting assumption that many young men of college age were

> …deranged…I mean, that in college they come under the influence of views, feelings, and prejudices, so different from those of men in common life, that charity should lead us to regard them as we would men under strong hallucination, if not partial insanity, assured that after they have left college they will see the fallacy of many of the sentiments and prejudices that lead them…to abuse one another, oppose the Faculty, justify convivial excesses, and sympathize strongly with those disciplined for gross immoralities, so as even to organize rebellion against lawful authority. I had found that if we could, by bearing or forbearing, get such men through college and away from the influence of false notions, they would generally…become respectable. Hence, I made every effort to get them over this Rubicon…[232]

---

[231] Hitchcock, *Reminiscences*, 318.

[232] Ibid., 320.

Hitchcock's illnesses continued to cause him difficulty during his presidency. He constantly expected death. As always, he maintained a religious perspective on his suffering. His condition led him to the conclusion that "if help should come [to Amherst College] it was not through my own strength or wisdom. Then, and not till then, was God's arm laid bare. The exhilaration produced by [Amherst's financial recovery] gave me new life to perform my duties and battle with disease."[233] Nonetheless, he found it necessary to take leave of his position twice: once in 1847, where he spent several weeks in Richmond, Virginia resting, and again in 1850, when he and his wife toured much of Europe.

The 1850 tour covered much of Britain, Ireland, the German states, France, and Switzerland. Hitchcock tried to see geological sites, to meet European colleagues and to engage in sightseeing. He also visited agricultural schools and published a report on them when he returned. Wherever Hitchcock went in his travels, he always described the state of the region's geology, romantic natural beauty, and religion. In England, Scotland, and Wales, he found the state of religion to be mostly positive, with various people more forthright in their declarations of Christian faith than most Americans he had met. However, Britain appeared to be fettered by class differences more than America, and some people he met there were apprehensive about the effect of universal education on their servants. The Irish and Germans stood out to him as being good natured and particularly hospitable to strangers, although this charm, in the case of Germany,

[233] Ibid., 336.

sometimes "forms the sweet pill in which fatal religious error is conceived."[234]

In Wales, Hitchcock found traces in rock which indicated that glaciers had once covered the landscape. This intrigued him, as he had been changing his views on the mechanism by which the gravel moraines and erratic boulders in New England had been deposited. At first he had thought that these phenomena had been deposited by a worldwide flood, most likely the Noachic deluge. His final position was that at least in New England, the rocks and gravel had been deposited by "glacio-aqueous" mechanisms, essentially a combination of floods and icebergs.

In Switzerland, Hitchcock was finally able to view actual glaciers. He was ecstatic at the beauty of the Alps, and indulged in his typical rhetoric of romanticism and sublimity when viewing a sunrise from the Rigi Culm Mountain. "[W]e were in the midst of the most unearthly scene that I ever witnessed, as we stood above, the top of the cloud that filled all the valleys of Switzerland, and I felt an almost irresistible desire to launch forth on its fleecy undulations, so like celestial scenery did it seem…I never had witnessed such a scene before, and never expect to witness another."[235]

After returning home from Europe, Hitchcock spent another four years as Amherst President. His illness (to whatever extent it was real) finally got the better of him, and he resigned from the Presidency in the summer of 1854. William Augustus Stearns succeeded him as President. In his resignation speech, Hitchcock outlined Amherst's growth during his tenure. The speech was an interesting combination of Hitchcock's "religious/romantic" and "scientific/rational" styles. He enumerated in great

[234] Ibid., 354.

[235] Ibid., 361.

detail the college's increased laboratory supplies and museum specimens. Simultaneously, he described the progress of his temperance campaign on campus and the number of revivals which had occurred during his and his predecessor Humphrey's administrations. Hitchcock also noted that the proportion of graduates who became missionaries and ministers compared favorably with ratios in other colleges. He also presented statistics on the growth of the Amherst Charity Fund, which was dedicated to the college's original purpose: to enable young men of little means to obtain an education for the purpose of entering the ministry. As might be expected, Hitchcock also complained about his poor health and his inability to finish a comprehensive and systematic work on science-religion connections. Hitchcock gave the credit for all the improvements which had taken place during his tenure to prayer and Divine Providence.

Hitchcock's final, summarizing statement encapsulates many of the passions of his life, and is a fitting capstone to his account of his Presidency:

> [W]ere I in search of a forlorn hope, either for the defence of my own life and interests, or the cause of learning, of liberty, of temperance, or of religion, I know not where I should look with so much confidence for efficient volunteers, as to the present members of Amherst College. I trust…that it will need no very protracted experience to satisfy you that this encomium is deserved. May God give you eminent success in carrying forward this noble enterprise of linking together by indissoluble bonds, and identifying learning and religion. May the future of this College show that it has done more in this blessed work, than the most sanguine expectations and the strongest faith of its founders and patrons ever anticipated.[236]

Ichnological Summation, Last Years and Legacy (1855-1864)

[236] Hitchcock, *Address on Retiring from the Presidency*, 71.

After Hitchcock resigned from the Presidency, he continued to publish his works at a fairly quick pace. Even during the last four years of the Presidency, he had managed to publish his massive, more than 500 page *The Religion of Geology* in 1851, contributed half of a hagiographical biography of Mary Lyon, founder of Mt. Holyoke Female Seminary in 1852, and put out a general *Outline of the Geology of the Globe* in 1853. He retained his professorship of Geology and Natural Theology at Amherst, but his responsibilities were considerably reduced from his days as President. Thus, he was able to devote more time to several areas of research in geology and paleontology.

Between 1852 and 1856, Hitchcock wrote a report on *Illustrations of Surface Geology* for the new Smithsonian Institution. Surface geology is the study of post-Tertiary geological formations such as the Pleistocene, which consist of glacial-deposited erratic boulders and gravel moraines, as well as remnants of beaches and river terraces. By the late 1850s, the formations that contained these phenomena went under the general term of the "Drift," as opposed to its earlier name, the "Diluvium," which referred to substances deposited by a Deluge. This report contained Hitchcock's final opinion on the origin of the drift phenomena. He had had the opportunity to observe actual glaciers during his visit to Switzerland in 1850, and thus was now better able to detect what sort of traces they would leave. Hitchcock now considered Noah's flood to have been confined to the ancient Near East, and hence not to be the cause of the moraines, terraces, and erratic boulders in New England. At this point, the possible causes included a pre-Adamic deluge, glacial action, icebergs, or some combination thereof.

Hitchcock noted that surface geology had received in-depth study relatively late in the history of geology. There is a certain irony, considered in retrospect, that the two

works which he praised as being most noteworthy in this subject were Charles Darwin's and Robert Chambers'. Chambers had already published anonymously on evolutionary theory, and Darwin would within two years of the publication of *Illustrations*.

In *Illustrations*, Hitchcock said that while there appeared to be traces of glacial action remaining in New England and Britain, the glaciers most probably preceded the main period of gravel and boulder deposition and the creation of striation marks on rocks. He considered the most likely origin of these phenomena to be the propulsion of large icebergs by some sort of deluge over the prehistoric British and American landscape. He was uncertain whether glaciers were the cause of all drift phenomena for several reasons. The "grand difficulty" was that for glaciers to have been the cause of all the drift phenomena observed in North America, there would have to have been a "glacier…wide enough to reach from Newfoundland to the Rocky Mountains…[a]ll known glaciers occur in valleys, not many miles wide, and so did the supposed ancient glaciers, of which traces now exist."[237] Hitchcock was not ready to concede the existence of a giant continental ice sheet, especially since the Rockies had not been given a thorough geological survey, and the existence of drift-type phenomena there was still an open question.

Hitchcock favored the iceberg theory because it seemed to him to have fewer difficulties than any other in accounting for the drift phenomena. In his summation of the possible causes of drift, he included glaciers, icebergs, water-induced landslides, earthquakes, and yearly ice floods occurring over rivers. He did not consider any of his

[237] Hitchcock, *Illustrations of Surface Geology*, Smithsonian Contributions to Knowledge, vol. IX (Washington, D.C.: Smithsonian Institution, 1857), 70-71.

conclusions to be final, and said that "[i]t becomes me…to be very modest in urging my conclusions upon others. If they cannot adopt my explications, I hope they will at least find my facts to be of some little service in reaching better conclusions.[238] Hitchcock's views on the drift had certainly changed considerably since his confident 1823 claim in "The Utility of Natural History" that Noah's Flood was the cause of all such phenomena. He did *not* give up a belief in a Noachic Deluge, but limited its range to the ancient Near East, and hence rendered it utterly irrelevant to the New England formations.

In 1856, Hitchcock was asked to head the geological survey of Vermont. He was initially against it, as he "was borne down by so many severe infirmities, that all desire to have any thing to do with another State survey was gone." In addition, the previous three people assigned to do the survey had died, and he feared that he would suffer their fate. He eventually agreed to undertake the survey, but unlike the landmark Massachusetts survey, assistants did most of the field work and the writing.

While working on the Vermont survey, Hitchcock was completing the most comprehensive treatment of the field in which he made the most original contributions, the study of fossil footprints. This was in some ways the culmination of his career. In 1858, he published *Ichnology of New England. A Report on the Sandstone of the Connecticut Valley, especially its Fossil Footmarks*. Hitchcock identified the sandstone of this region as being of the Oolitic and Liassic periods of geological history (archaic terms for Jurassic, which he also used).

In previous reports, Hitchcock classified the various footprints into several taxonomic orders based on the Linnaean system (Kingdom, Phylum, Class, Order,

[238] Ibid., 75.

Family, Genus, Species). In the 1858 report, however, he attempted to bypass conventional Linnaean terminology and classify all of the prints under the Kingdom *Lithichnozoa*, meaning "the stony track animals." This was a "a sort of ichnofossil paraclassification- a classification parallel to, but separate from the standard Linnean [sic] approach…"[239] These were divided into sub-kingdoms, depending on whether Hitchcock thought that vertebrates or invertebrates had made the tracks. Each sub-kingdom was divided into several groups by probable origin, and the groups into genera and species. The ten groups were as follows: I. Marsupialoid mammals; II. Pachydactylous (thick-toed) birds; III. Leptodactylous (narrow-toed) birds; IV: Ornithoid lizards or batrachians (amphibians); V. Lizards; VI. Batrachians (amphibians); VII. Chelonians (turtles); VIII. Fishes; IX. Crustaceans, Myriapods, and Insects; and X. Annelidans (segmented worms). Hitchcock used 30 different characteristics to differentiate all the fossil tracks that he found.

Many tracks did not seem to fit neatly into any category, and seemed to combine many features of current animal groups. For instance, Hitchcock placed the tracks of the *Anomoepus* in the group of marsupials, since its prints and tail impressions appeared strongly kangaroo-like overall, yet the toes seemed extremely birdlike. As his career neared an end, he came quite close to the current consensus: that most of the footprints belonged to bipedal dinosaurs, yet he never quite made the conceptual leap.

At the end of the report, Hitchcock came to several general conclusions regarding the tracks and the environment in which they were laid down. He inferred that the tracks

---

[239] William A.S. Sarjeant, "A name for the trace of an act: approaches to the nomenclature and classification of fossil vertebrate footprints," in *Dinosaur Systematics*, 300.

must have been made when the sandstone was still in a malleable state, on the shore of an ancient estuary, lake, or river. The climate of New England was tropical then, as inferred from tropical-type plants discovered in the region, as well as other factors. Hitchcock suddenly veered from these rational scientific conclusions into metaphysical speculation. In the very next paragraph, he noted that the persistence of the footprints through ages ought to make people aware that their actions could create impressions that could endure almost eternally. Ironically, this idea is a moralized and Christianized form of Laplace's determinism, in which someone who knew all positions and velocities of particles throughout the universe could predict all subsequent events with complete accuracy. It also echoes his conception of the universe as a Telegraphic System recording human deeds from *The Religion of Geology* (1851).

> With the register before us of the decision of an insect's will, made fifty thousand years ago, and the corresponding movement in the muscles of its legs, who will dare to say that any action of ours, or any operation of the human mind, will certainly be so lost that it may not reappear in all its freshness ten thousand ages hence![240]

As will now seem typical of Hitchcock's style, he concludes the dry, sober report with a burst of romantic rhetoric combined with religious sentiment, capped with anticipation of his rapidly approaching death. The individual components of Hitchcock's worldview were common in his day. Many scientists used romantic rhetoric, including Charles Darwin, as evidenced by the conclusion to *On the Origin of Species*. Most attempted to justify their study of science with an appeal to religion. What Hitchcock is unique in is the sheer intensity with which he blended wild rhapsodizing with evangelical

---

[240] Hitchcock, *Ichnology of New England. A Report on the Sandstone of the Connecticut Valley, especially its Fossil Footmarks* (Boston: William White, 1858; reprint, New York: Arno Press, 1974), 174.

religion while maintaining scientific rigor in his scholarly works, as shown in this coda to the ichnological report:

> What a wonderful menagerie! Who would believe that such a register lay buried in the strata? To open the leaves, to unroll the papyrus, has been an intensively interesting though difficult work, having all the excitement and marvellous developments of romance…Did the same unvarying forms of organization meet us in every variety of climate and condition, we might well doubt whether the author of Nature was also a Providential Father. But his parental care shines forth illustriously in these anomalous forms of sandstone days, and awakens the delightful confidence that in like manner he will consult and provide for the wants of individuals…[to study the botany of this period,] some years of careful study would be a prerequisite: a larger number probably than one can hope for, whose sun is so near the horizon as mine.[241]

Through all of his works, the essential strands of Hitchcock's character can be seen: the rational scientist, the passionate romantic nature-lover, the clergyman, and the morbid hypochondriac.

Hitchcock's final years were marked by yet more sickness and pain, as he perceived it. Nonetheless, he continued to write copiously, often contributing chapters in works authored primarily by his sons. In 1859, the Amherst faculty and students presented him with a commemorative plate containing a picture of the surrounding mountains and fossil footprints, in gratitude for all his services to the college, and in celebration of one of his temporary recuperations. In 1861, Hitchcock finished the almost 1000-page report on Vermont's geology, and in 1863, he wrote an article about natural and divine law that responded forcefully to Darwin's theory of evolution. Another project that he successfully completed was the writing of his autobiographical *Reminiscences of Amherst College*, which provides a great deal of rich information on his life and works, as well as on the early development of Amherst.

---

[241] Ibid., 190.

In the summer and fall of 1863, Hitchcock wrote a supplement to his ichnological report (published posthumously in 1865), in which he described the influence of new discoveries on his thought, including that of the genuine fossil bird, *Archaeopteryx*. Again, he fell just short of discovering the dinosaurian origin of the tracks, yet his final comments on the matter in late 1863 suggest that if he had lived a few more years, he would have made the correct conclusion:

> [T]he tracks…may well raise the question whether an animal might not be a real quadruped moving on four feet, with a tail, and yet a real bird…the facts…should lead us…certainly to admit that the bird-type in sandstone days may have exhibited forms very different from the perfect bird-type of the present day… I doubt not that similar markings will reward the researches of other explorers in the [footprint] Cabinet, of which I must now take a final leave.[242]

In the summer of 1863, in the beginning of what was to be his final illness, while simultaneously working on *Reminiscenses* and *Supplement to the Ichnology*, Hitchcock wrote to his old friend Benjamin Silliman of Yale:

> I still linger on the shores of time, balanced , as it were, between life and death, and suffering intensely. Still God mingles many mercies in the bitter cup, and allows me to accomplish several things which I had not hoped to do [including the completion of *Reminiscences*]… I was greatly indebted to you for your last kind letter of sympathy and condolence, and intended to answer it, but my strength would not allow. Many debts of this kind must remain unpaid till I enter, if I ever do, the house not made with hands, eternal in the heavens. God grant that in such spiritual bodies, without sin, we may hold everlasting communion.[243]

The end came in 1864, "Feb. 27th, at six in the morning, aged seventy years and nine months."[244] Hitchcock was buried in Amherst. His main eulogizer, Amherst Professor

---

[242] Hitchcock, *Supplement to the Ichnology of New England* (Boston: Wright and Potter, 1865), 37.

[243] Hitchcock to Silliman, 26 August 1863, cited in Fisher, *Life of Benjamin Silliman*, 306-307.

William S. Tyler, noted years afterward that "The [grave] spot is now marked by a plain granite obelisk bearing, together with the dates of his birth and death, this simple and truthful inscription: EDWARD HITCHCOCK, PASTOR IN CONWAY, PRESIDENT AND PROFESSOR IN AMHERST COLLEGE. A LEADER IN SCIENCE, A LOVER OF MAN, A FRIEND OF GOD, EVER ILLUSTRATING 'THE CROSS IN NATURE, AND NATURE IN THE CROSS.'[245]

Of Hitchcock's children, two in particular became prominent. His son Edward Hitchcock, Jr., studied at Amherst and eventually obtained an M.D. Of strong physique, unlike his father, he instituted the first formal physical education program in an American college at Amherst. He was a professor at Amherst for many years, affectionately known as "The Old Doc." Charles Henry Hitchcock became a minister and geologist like his father, ending his days doing vulcanological research in Hawaii.

Hitchcock is still regarded by the paleontological community as the founder of the subdiscipline of paleoichnology. Although most of the footprints have been properly classified as dinosaurian, their precise identification remains in some cases ambiguous. The footprints were put in a museum of their own during Hitchcock's lifetime, the Appleton Cabinet (Fig. 2), and then transferred to Amherst's Pratt Museum of Natural History. Very recently, Amherst College has decided to open a new museum of natural history showcasing Hitchcock's collections, which were neglected in the basement of the

---

[244] "Obituary: Edward Hitchcock," *American Journal of Science* 2nd series 37, no. 110 (March 1864): 302.

[245] William S. Tyler, *A history of Amherst college during the administrations of its first five presidents, from 1821 to 1891* [book on-line] (New York, F. H. Hitchcock, 1895, accessed 7 July 2005); available from Richard J. Yanco's website http://www.amherst.edu/~rjyanco/amherst/history/1894tyler-ws/chapter07/menu.html

present museum. It will open in the spring of 2006.[246] In both scientific and religious senses, Hitchcock's legacy lives on.

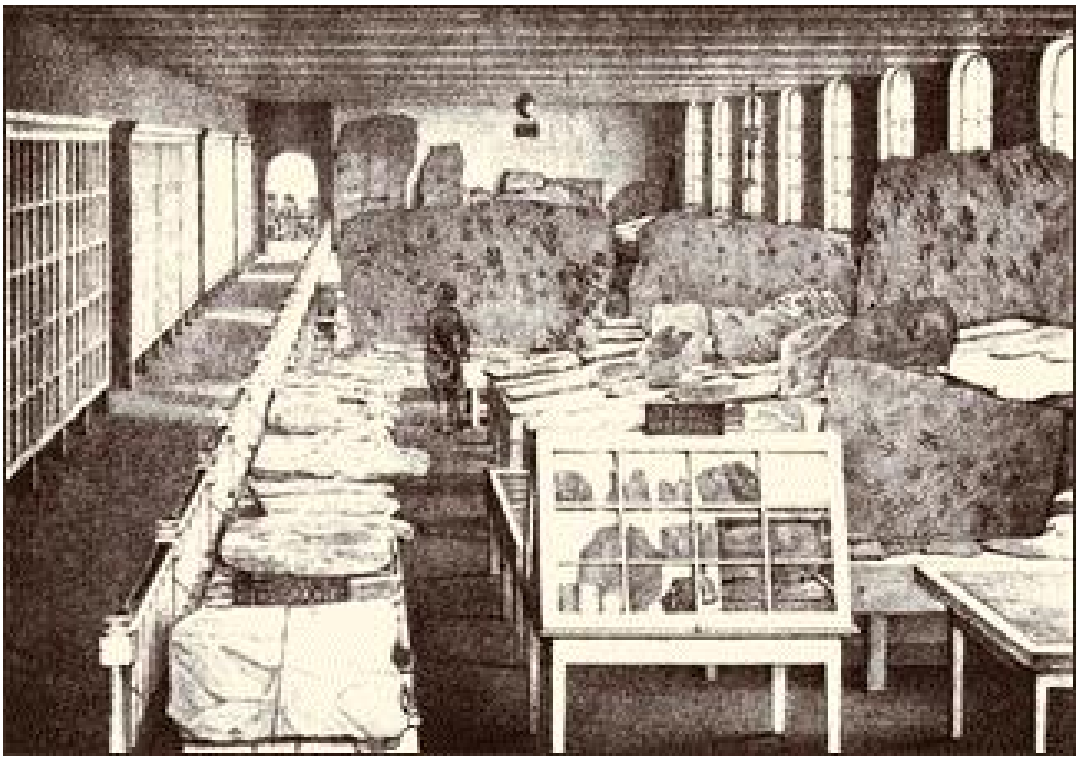

Figure 2. Hitchcock's fossil footprint collection in the Appleton Cabinet. From Hitchcock, *Ichnology of New England*, Plate IV.

[246] See Pick, "Tracking a Dinosaur Pioneer."

Chapter 3: Hitchcock's Views on Science and Religion from the Conway Ministry to the Moses Stuart Controversy (1823-1836)

Hitchcock's views on science and religion developed through several stages during his life. The initial stage lasted from approximately 1820 to 1835. One distinguishing feature of his writings in this period is his identification of diluvial deposits as being remnants of a worldwide flood, which he specifically identified as Noah's flood. Some science/religion writings of this period included sermons from his service as pastor at the Congregational Church in Conway and articles he wrote for the *Christian Spectator* and Silliman's *American Journal of Science*. The most important of these were an 1823 sermon entitled *The Utility of Natural History* and two separate reviews of Rev. William Buckland's *Reliquianae Diluvianae* from 1824.

Hitchcock's position on the nature and extent of Noah's flood would change more often than any other feature of his overall reconciliation of science and religion. The change in his views marks the second phase of his science/religion writings. Between 1835 and 1838, he wrote a series of long articles on Creation and the Flood for the scholarly Congregationalist journal *The Biblical Repository*, published at Andover Theological Seminary. In these articles, Hitchcock described his theories on connections and reconciliations between geological science and Biblical events. The promulgation of these theories led to his 1836 controversy with Moses Stuart on the proper interpretation of Genesis I. From 1836 to 1838, Hitchcock began to dissociate the theory of a "Deluge" which left deposits in New England from Noah's flood. However, he still felt that there had been a massive and nearly universal pre-Adamic deluge consisting mostly of water.

Hitchcock's writings on science and religion appear to have tapered off somewhat between 1838 and 1850. During this period, he worked intensively on finishing the Massachusetts geological survey and continuing ichnological research, as well as getting Amherst College out of debt.

Hitchcock's mature writings on science and religion date from 1851 to 1863. By this time, he had relegated Noah's flood to a local area of the ancient Near East. He held that it had still extirpated all humans then living on the planet outside of the ark, as all of them lived in the area flooded. However, the diluvial deposits in the Northern Hemisphere not only had nothing to do with this event, but they were not wholly caused by water. As mentioned above in the description of *Illustrations of Surface Geology*, Hitchcock now thought that these deposits-now termed *drift*, not diluvium- had been laid down primarily by water-borne icebergs. The main work representative of Hitchcock's mature thought on science and religion is his 1851 *The Religion of Geology and its Collected Sciences*, especially the chapter he added in 1859 to clarify his views on geology and religion.

Hitchcock published several moralistic, Christological talks on science and religion in *Religious Lectures on Peculiar Phenomena in the Four Seasons* (1849). Several important lectures of Hitchcock's from the mid-1850s on the general relations of science and religion, and the nature of God's miraculous interventions in nature, were collected in the 1857 anthology *Religion Truth, Illustrated by Science*. Hitchcock's final publications on science and religion were two long articles in the *Bibliotheca Sacra*, Andover's successor joutnal to the *Biblical Repository*The first, "The C ross in Nature and Nature in the Cross," from 1861, attempted to go beyond natural theology and find

indicators of revealed religion in nature, such as the fallen nature of the world and the redemptive sacrifice of Christ. The second, from 1863, "The Law of Nature's Constancy Subordinate to the Higher Law of Change," is of particular interest because in it, Hitchcock made his only direct challenge to *Darwinian* evolution.

In all of these works, the three main tropes of Hitchcock's life (religion, rationality, and romanticism) are evident. Ecstatic visions of doing science in a sinless afterlife are a common feature of Hitchcock's religious works, from *The Utility of Natural History* in 1823 to "The Law of Nature's Constancy" in 1863. In Hitchcock's scientific works, he minimized specifically Christological references, whether he omitted them himself or they were deleted by editors. "[Hitchcock] felt it his duty to make frequent references of a religious character, but apparently some of them were edited out of his writings for [the *American Journal of Science*]. He wrote to Silliman [in 1823] that 'every remark of a religious character was struck out of the last part of my sketch…' He therefore did not think it was Silliman who had altered a geological sketch in the *Journal*; but, Hitchcock added, he did not mean to complain."[247] Whatever the truth of the matter was, the fact is that even a journal edited by the deeply religious Silliman edited some of Hitchcock's remarks. This testifies to the depth of Hitchcock's religious commitment. Hitchcock may even have been passionately devout to an extent seen as slightly socially inappropriate. Hitchcock did accept the cuts, though, showing that he understood the differing literary conventions for sermons and scientific articles.

Hitchcock's religiosity notwithstanding, he also displayed a firm commitment to scientific accuracy and a rational approach to understanding Genesis in light of modern

[247] Gloria Robinson, "Edward Hitchcock," 55.

knowledge. Note the term "rationality"; this does not imply that Hitchcock was a rationalist in the sense of believing that unaided human reason could discover the truths of the universe. He is better described as a neo-Baconian empiricist, in that he frequently referred to the neccesity of investigating facts, and accused both pre-geological Biblical cosmogonists and evolutionists of being caught up in extravagant hypotheses. Hitchcock castigated their theories in striking terms. He predicted that evolution's fate was to be consigned to the far side of the moon reserved for abortive creations/ideas by Milton, and that some of the earlier cosmogonists' theories were comparable to Muhammad's winged horse Alborak.[248] Nonetheless, Hitchcock placed great faith in the power of scientific reasoning and proof to legitimately determine the nature of the universe, and even alter the proper interpretation and meaning of the Bible. To that extent, he was an exponent of rationality.

The final underlying motif in Hitchcock's work, that of romanticism, has not been sufficiently explored by scholars. Aside from the recent studies by Haltunnen and Levin, only his scientific and religious thought has been analyzed in any depth. As I discuss Hitchcock's major science/religion works, I will demonstrate how romantic imagery is used to contrast nature's innocent beauty with societal corruption, and to increase readers' love and awe for God.

Earliest Thoughts and Cuvierian View of the Flood (1820-1823)

The earliest work of Hitchcock's on science and religion is an undated manuscript

[248] For the Milton quote, see above, 94; for the Alborak quote, see Hitchcock, "Notice and Review of the *Reliquianae Diluvianae*," *American Journal of Science* 8, no. 1 (January 1824): 150.

entitled "Essays on the Mosaic Chronology of the World Compared with the ancient monuments of Arts and Science and History And with the present appearances of the earth." Rodney Stiling dates the manuscript to 1820 based on the references and theories Hitchcock cites therein.[249] Hitchcock thus wrote the essays after his (re)conversion to Congregationalism and before the beginning of his pastorate at Conway in 1821. These are very important essays to analyze because many of the motifs displayed here would become typical of Hitchcock's argumentation for the rest of his career, though the way he used them would change. In sum, Hitchcock here showed a claimed commitment to scientific facts as against extravagant "hypotheses," and used accounts in world mythology to defend the veracity of the Bible. These tropes would be constantly repeated in his science/religion work. It requires careful analysis to tease out how his use of them changed over time.

In these essays, Hitchcock attempted to defend the Biblical account of Creation and the Flood in two ways. The first of the two essays in this manuscript, "[Mosaic Chronology compared] with the ancient monuments of Art and Science, including ancient history & tradition," mainly argued for the Bible's accuracy from ancient history and the mythologies of various peoples rather than from science proper. Hitchcock tried to defend Mosaic chronology here because, he claimed, it was a frequent target for anti-Christian infidels. In his survey, he pointed out resemblances between the accounts of Creation and the flood in Genesis and in Greek, Roman, Egyptian, Indian and other mythologies.

Hitchcock concluded that such similar tales and mythologies must have had a

[249] Stiling, "The Diminishing Deluge," 59-60.

common origin in a factual occurence. Of course, he claimed that all other versions but the Bible's had been combined with accretions of idolatry and absurdity. Indeed, "This then [the Bible's account] is the account to be preferred to all others if considered merely as a human composition…[the Biblical creation and flood narratives] cannot be doubted by any one in the full possession of his faculties."[250] This reference implies that anyone rational and reasonable would have to accept the Genesis narratives as fact; (note the appeal to rationality here). The argument was mainly made using bombastic rhetoric rather than evidence. In addition to these arguments from history and tradition, Hitchcock attempted to refute claims of skeptics that ancient Egyptian, Indian, and Chinese chronologies and astronomical tables demonstrated an immense antiquity for the human race. Hitchcock always had a far greater objection to the existence of humans before Adam than of other forms of life, which could always be conveniently consigned to the "gap" between the first two verses of Genesis that he was soon to rely on.

The second essay in the manuscript addressed geological issues directly in defending the truth of Noah's flood. The first essay had been representative of a long tradition of Christian and Jewish writers trying to fit the Deluge into world *history* since at least tbe time of Josephus. However, Hitchcock was trying to differentiate his approach from earlier writers in basing his arguments on scientific "facts," i.e a Baconian empiricist approach. Hitchcock began this second essay by noting that until recently, "little could have been advanced on this subject but *hypothesis*. But now that geologists have turned their zealous attention to the structure of the crust of our globe and the

[250] Hitchcock, "Essays on the Mosaic Chronology of the World Compared with the ancient monuments of Arts and Science and History And with the present appearances of the earth. I. [Mosaic Chronology compared] with the ancient monuments of Art and Science, including ancient history & tradition," ca. 1820, Hitchcock mss.

fossils it contains, we are no longer compelled to substitute imagination for *fact* or make inductions beyond what the premises will allow."[251]

After this eminently Baconian introduction, Hitchcock outlined recent findings in geology and paleontology. He relied very heavily on the writings of the eminent French comparative anatomist and paleontologist Georges Cuvier in this manuscript. Stiling regards this second essay as "in some way a result of the recent availibility of [an] American [translated] edition of Cuvier. The essay reads, in fact, as if it was a first attempt at understanding and applying Cuvier's work to Hitchcock's own interests."[252] Hitchcock had great esteem for Cuvier, regarding the Frenchman's work as "forming a new epoch in the geognosy of our world."[253] The main work of Cuvier's Hitchcock used in this essay was the "Preliminary Discourse" to his 1812 *Recherches sur les Ossemens Fossiles de Quadrepedes* [Researches on the Fossil Bones of Quadrupeds]. The "Preliminary Discourse" set forth Cuvier's theories on earth history and the successive creation and extinction of organisms. Interestingly, "[t]he English translation [of the Preliminary Discourse] was given the old-fashioned title, *Essays on the Theory of the Earth*, a phrase that Cuvier had studiously avoided."[254] Ironically, this title was more reminiscent of the 17th century cosmogonic theories of Thomas Burnet and John

---

[251] Hitchcock, "Essays on the Mosaic Chronology of the World…II. Proofs of the Mosaic account of the deluge from an examination of the internal structure of the earth," ca. 1820, Hitchcock mss.

[252] Stiling, "The Diminishing Deluge," 60, n.8.

[253] Hitchcock, "Essays…Proofs of the Mosaic account of the deluge."

[254] Young, *The Discovery of Evolution*, 94.

Woodward, and not the empiricism to which Cuvier and Hitchcock aspired.

Cuvier posited that over the course of geological time, a series of catastrophes had caused the extinction of successive groups of prehistoric fauna. These catastrophes seemed to have resulted from the violent flooding of the earth. Using as evidence strata from Paris which contained an alternating sequence of terrestrial and marine fossils, as well as marine fossils found far inland, Cuvier concluded that the present continents had once been prehistoric seabeds, and vice versa. Most importantly, for Hitchcock's purpose, Cuvier claimed that the last of these catastrophic global floods " 'cannot be dated much farther back than 5 or 6000 years ago.'"[255] Hitchcock gleefully pointed to this conclusion as justifying the literal account of Noah's flood. "Let infidelity hear it, let those who make it a point to ridicule Moses hear the result of fifteen years labor of one of the first naturalists in the world and let such ask themselves if they are better qualified to judge on this subject than Cuvier?"[256]

Hitchcock went a step further than Cuvier on this matter, in that he explicitly identified the most recent geological catastrophic flood as *being* Noah's flood. Cuvier regarded all ancient accounts of this flood, including the Biblical one, as being

> highly corrupted accounts that could not be taken as literal historical fact. Conversely, however, he argued that they were all worth examining, to find the core of historicity that remained when the fabulous or legendary elements wee peeled away. What then remained, he claimed, was a body of convergent textual evidence that the earth's surface had indeed been ravaged by a "catastrophe" of some kind…back in the infancy of human civilization if not of humanity itself.[257]

---

[255] Hitchcock, "Essays…Proofs of the Mosaic account of the deluge."

[256] Ibid.

[257] Martin J.S. Rudwick, *Georges Cuvier, Fossil Bones, and Geological Catastrophes: New Translations & Interpretations of the Primary Texts* (Chicago and London: University of Chicago Press, 1997), 260. Rudwick has shown how the earliest

Cuvier and Hitchcock were catastrophists in the sense of claiming that physical forces of greater *intensity* operated in the remote past than at present (such as global floods). This did *not* mean that they held that these forces were of a different *kind* from those currently present in nature. They were not relying on explicit miracles to explain the course of earth history. This point has been emphasized in the past 35 years of work on the history of geology. In general, catastrophists of the nineteenth century were as "scientific" in their methodology as uniformitarians, if not more so, and did not kowtow to religious dogma.[258]

From some of Hitchcock's arguments in the essay, it would appear that he was arguing for a young earth. "…when natural history was in its infancy [infidels] might easily collect a few insulated facts which afforded a presumptive proof that the world is more than 6000 years old. This resort is now failing them since men of superior minds have introduced the Baconian rules of philosophizing into geology;"[259] Hitchcock indeed used proofs such as the rate of the growth of sand dunes and the carving of riverbeds to argue for the "recentness of the present state of the world…"[260] A careful reading of the

---

English translation of Cuvier's work (which Hitchcock utilized) added commentary and notes that falsely implied that Cuvier supported a literal interpretation of Genesis. See also pp. xi, 181.

[258] See especially Reijer Hooykaas, *Catastrophism in geology, its scientific character in relation to actualism and uniformitarianism*, Medelingen der Koninkluke Nederlandse Akademie van Wetenschappen, afd. Letterkundem Nieuwe Reeks, Deel 33, No. 7 (Amsterdam & London: North-Holland Pub. Co., 1970; Trevor Palmer, *Controversy, Catastrophism and Evolution: The Ongoing Debate* (New York: Kluwer/Plenum, 1999), 54-70.

[259] Ibid.

[260] Ibid.

essay, however, shows that in discussing the rock layers deposited prior to the Deluge, Hitchcock said that they represented "a series of epochs anterior the present time [sic?] the steps of which may be ascertained with with precision though the intervening period of time cannot be determined with any degree of certainty."[261]

Hitchcock was clearly arguing against those who denied a global flood in the time of Noah rather than against the idea of pre-Adamic geological time per se. Though he did not come out with this opinion in public yet, he said that there had indeed been a long expanse of time prior to Adam, and that "though the the letter of the Mosaic account be contradicted we trust the spirit is not…It has long been the opinion of geologists that the work of the creation was a very gradual ~~thing~~ work and that the six days…are only relative terms.[262]

In concluding his essay, Hitchcock addressed some difficulties with his first theory of the flood, which I term "Cuvierian," following Stiling's analysis of Cuvier's influence on Hitchcock at this point. One particularly knotty problem was the apparent absence of human fossils from geological strata, which should have been deposited by the flood. Hitchcock suggested that in this model the seabeds had changed place with the primeval continents, so any human remains would have been fossilized at the bottom of the sea. He supported this idea Biblically with reference to the phrase "All the fountains of the great deep were broken up." This passage, Hitchcock claimed, implied an intrusion of the ocean onto land. He suggested that the islands of the South Pacific might be

---

[261] Ibid, Hitchcock's correction.

[262] Ibid.

remnants of an antediluvian continent.

Hitchcock also speculated about the ultimate destiny of the planet at the end of this essay. He put forth here his first interpretation of the predicted Final Conflagration. Quoting various Scriptural verses describing the nature and effect of the Conflagration, Hitchcock concluded that "the heavens or atmosphere and the earth will undergo the operation of fire…this will take place at the day of judgement…that a new heavens and earth will succeed the old."[263] The conflagration would not destroy the earth, but only renovate it. He supported this proposition with an appeal to ancient concepts of the earth undergoing successive destructions by water and fire, and by referencing the Plutonist/Vulcanist school of geology, which held that the major rocks of the crust had condensed from molten rock.

Hitchcock claimed that it gave Christians "more exalted views of the wisdom and goodness of the creator" to surmise that the earth and natural law would continue to exist in the post-conflagration paradise, only purged "from the contaminating effects of sin, than to suppose [that the earth] will be annihilated?"[264] Hitchcock would almost continually employ variants of the phrase "X gives us a more exalted view of God's wisdom/plans/beneficence" to calm Christian fears of ideas such as geological time and extinction. To Hitchcock, a sinless earth would effectively *be* at least part of heaven.

Hitchcock, true to his Baconian framework, did not insist that this semi-naturalistic picture of a post-apocalyptic earth was the only possible Christian interpretation of the end of days. As always, he advised readers not to "confound the

[263] Ibid.

[264] Ibid.

hypothetical reasoning advanced in the latter part of this essay with the facts which are here advanced in support of our main propositions relating to the creation and deluge." His ideas "may be true and they may be false…Perhaps their investigation may constitute a part of our employment and pleasure in that state where we shall no more see through a glass darkly, but derive our knowledge from the fountain of eternal truth."[265] This is the first use of Hitchcock's recurring near-obsession with the idea of continuing his scientific research in the afterlife. This idea was not unknown among scientists in this period, but Hitchcock elaborated on it in such detail in so many works that it legitimately forms one of the major distinctive tropes of his work.

This initial essay exhibits most, but not all of the major tropes that would appear in Hitchcock's work. His insistence on scientific theory based on Baconian-style facts is quite evident, as is his conviction that science performed in this correct manner can only strengthen and verify the Bible and Christianity. Hitchcock's romanticism is somewhat subdued here, but it would appear in full flower, combined with the above themes, in his September 1823 lecture, *Utility of Natural History*.

Utility of Natural History represents a watershed in Hitchcock's career, in two respects: First, he came out in public with his support for an ancient universe, and second, the sermon was before a professional association, the Berkshire Medical Institution in Pittsfield, Massachusetts. He gave the speech as part of the inauguration of a Lyceum for Natural History as a subdivision of the Institution. Hence, this can be seen as Hitchcock continuing his interest in professional scientific organization, evidenced both in his early involvement with the Society of Literary Adelphi in 1811 and his subsequent founding

[265] Ibid.

role in the AAGN/AAAS.

The Scriptural passages Hitchcock cited when he began his discourse were from the first book of Kings, describing Solomon's discourses on nature: "And he spake of trees, from the cedar tree that is in Lebanon, even unto the hyssop that springeth out of the wall: he spake also of beasts, and of fowl, and of creeping things, and of fishes."[266] He cited this verse to claim that God approved of the study of natural history, while denying that Solomon possessed scientific knowledge of the accuracy and extent of the present day. This beginning may have served to calm his own disquiet over the Christian pursuit of natural history, as evidenced by his letter to Silliman the previous December. Hitchcock's exegesis in *Utility* was as follows:

> The text means only, that [Solomon] was acquainted with all that was then known concerning [nature]. Yet on this supposition, we feel as if the example of Solomon, in this respect, were more to be regarded than that of any modern naturalist…For inspiration has pronounced him the wisest of men: and if a part of that wisdom consisted in a knowledge of natural history, it furnishes a presumptive evidence of the value of the pursuit. A man of eminent knowledge might be pronounced wise by his fellow men, while in the view of heaven his wisdom might be folly; since many things *highly esteemed among men are abomination in the sight of God*. But when [God] pronounces any particular attainments to be wisdom, we no longer hesitate to regard them as such…a *thus saith the Lord* is vastly more satisfactory than the uninspired declaration of any man, however eminent.[267]

Interestingly, Professor William Tyler cited the same verse to begin his eulogy at Hitchcock's funeral in 1864, showing that Hitchcock was an exemplar of the type of wise man who unites science and religion. These references may serve as bookends to Hitchcock's career in science/religion reconciliation.

---

[266] 1 Kgs. 4:33 AV [?]

[267] Hitchcock, *Utility of Natural History* (Pittsfield, MA: Phinehas Allen, 1823), 3-4, italics Hitchcock's.

Hitchcock continued his discourse with other examples of Biblical figures using nature's wonders to increase their piety and love of God. He then treated natural history's main uses. In advocating the "utility" of natural history, Hitchcock was appealing to the emphasis placed on the usefulness of sciences in the early United States, as well as the morally and religiously pure character of such studies. Hitchcock divided the utility of natural history into three componenents: social, intellectual, and religious. In the first case, he said that the study of natural history was socially useful primarily because it aided in the discovery of new medicinal remedies and the understanding of disease (a good tactic, considering that his audience here consisted of doctors!). In addition to this, natural history increased the love of one's country through the exploration of its beauty and resources.

Finally, the study of nature would furnish a source for morally pure recreation, as in most societal diversions, there was some poisonous element of human depravity. Hitchcock contrasted nature study in a passage which sums up Hitchcock's central concerns and passions neatly:

> But when nature is explored, merely as a source of pleasure…we enter a field entirely abstracted from human passions and contests, and seem to breathe an atmosphere of innocence and peace. There may be earthly pleasures more extatick [sic], but none are more calm and unadulterated, than the naturalist feels, when bursting away from a busy world, he roves through the dark imbowering woods; traces the murmuring stream through the solitary glen, or over the rocky precipice; and mounts the "cloud capt" mountain. With ardent curiosity he scans the varied flowers; seizes the curious mineral; observes the brilliant insect tribes, and listens to the tuneful birds. How the scene sooths every tumultous and anxious feeling in his bosom! harmonizes every power of his soul! and if he be a Christian, awakens a deep felt adoration and love of that God, whose glory and wisdom and goodness seem to breathe, like holy incense, from every object around him.[268]

[268] Ibid., 14.

Here Hitchcock's romantic sensibility can be seen to enter his discourse in earnest. Again, it can be seen how, for Hitchcock, scientific interest, romantic rambling, and religious devotion blended so easily into each other. For him, they were ultimately inseparable.

In the section on natural history and intellectual improvement, Hitchcock argued that nature deserved greater attention from Western intellectuals than it currently received. A study of the sublime and simple works of nature would help scholars reject false and overly complicated literature. He proposed that if artists could spend considerable time studying European classic sculptures and painting, naturalists too would benefit from exploring the world for the still greater beauties of nature. Hitchcock did not regard natural history as the core study of an educated man, though. Those remained rigorous disciplines such as mathematics and theology. Hitchcock was, however, trying to press for a crucial place for natural history in education. "I only ask that natural history may come in to clothe this skeleton [of theology, mathematics, metaphysics, and moral philosophy] with the flesh; and then, let the *belles lettres* smooth the inequalities and give the polish, and the work is finished."[269] He followed that with a typical Baconian statement about natural history's basis of facts, and that these required the vigorous use of the intellect.

The final part of *Utility*, that dealing with the relation of natural history and religion, was the most controversial. He began with a standard argument that nature demonstrated the existence and attributes of God, and provided support for the existence

[269] Ibid., 17, italics Hitchcock's.

of Noah's flood through phenomena such as gravel moraines and erratic boulders. However, he came out strongly against the attribution of all geological strata to the Flood. Hitchcock put a long footnote in the discourse describing the objections to flood geology in a recent British geological survey (that Hitchcock reviewed enthusiastically in Silliman's *Journal* the next year), Rev. William Daniel Conybeare and William Phillips' 1822 *Outlines of the Geology of England and Wales*. He then reviewed a few hypotheses attempting to reconcile the rock and fossil record with Genesis, among which were the Day/age and gap theories. He did not choose definitively between the reconciliation theories here; he was merely attempting to defend the idea of geological time to his listeners.[270]

Hitchcock admitted that to literalists unacquainted with geology, "such views as these may seem the result of a hasty and dangerous criticism…[here he criticizes early modern cosmogonists for their extravagant theories]. But the present constellation of European geologists are men of a very different stamp-men whose grand object is the collection of facts, and who are extremely cautious of hypothesis; adopting none, except such as seem absolutely necessary to explain appearances."[271] Quoting again from Conybeare and Phillips, Hitchcock concluded that once plausible reconciliation schemes had been devised, "every candid man must regard geology as affording a triumphant

---

[270] "Geological time" in the context of 19th century thought essentially means an awareness of a vast prehuman expanse of time, which contained animals now extinct. It took a while to divide this time into distinct components, especially in the public imagination, which saw it as one period of huge reptiles and mammoths, until at least the 1850s. Hitchcock did not attempt to give a precise quantitative figure to this time, but regarded it as vast-but *not* eternal as per Hutton.

[271] Ibid., 28-29.

support to the sacred historian."[272] This sounds rather weak to modern ears, but one must remember that he was trying to justify the study of geology as part of natural history to an audience of nongeologists. Calming their fears about religious difficulties was an important part of his argument.

Having summarized the utility of natural history, Hitchcock concluded with a strong call for the systematic promotion and professional organization of natural history in the United States. He added to this a piece of truly purple prose about studying nature in the afterlife, including probably the study of extraterrestrial life.

> It may indeed be doubted whether the material works of God will be subjects of investigation in another world. But to study and admire the immaterial, if not the material creation, will assuredly constitute a part of the enjoyments of heaven…O where is the naturalist so sunk below the dignity of his nature, so dead to the genuine influence of his pursuits, as not to feel kindling within him a holy and ardent anticipation of that blessed state!…where the field of knowledge will widen and brighten at every step, and from the throne of God, the soul, freed from the cumbrous shackles of mortality, will quaff the full and unalloyed streams of science and bliss forever and ever! *Amen.*[273]

Hitchcock's essential convictions about the union of science and religion would change little throughout the remainder of his career, although his choice of reconciliation schemes and views on the flood would vary considerably. His declarations about nature appear fulsome and extravagant nowadays. To the ears of his listeners, however, such declamations were expected. William J. Astore, who authored a study of an evangelical who popularized science in Victorian Britain, has commented astutely on the rhetoric and dilemmas of science in Hitchcock's era, and discussed Hitchcock briefly. "[S]cience was

---

[272] Ibid., loc.cit.

[273] Ibid., 31-32.

still a marginal activity in the 1820s and 1830s. The moral soundness of its knowledge, and moral character of its practitioners, were both hotly contested and absolutely vital to to its success."[274] This has led some scholars to portray scientists such as Hitchcock and Rev. William Buckland, his British contemporary, as using natural theology as a convenient "ploy…to reduce conflict with theologians while maintaining a dialogue with educated non-specialists."[275] I agree with Astore that this instrumental conception is a misleading approach to understanding figures as devout as Hitchcock evidently was. Astore reminds scholars that one has to consider early Victorian scientists as part of their religious culture.

> [Many scientists] strenuously objected to any uncoupling of science from moral or religious concerns…[including] Hitchcock…In their religiosity, these specialists reflected and reinforced the cultures of their day…When non-specialist Americans pursued science, they did so not merely for pleasure but for self-improvement…For many, their ultimate goal was to be inspired to worship God more devoutly. In this context, devotional utterances, which to present-day readers may seem overblown, self-indulgent, or insincere in their religiosity, were commended by mid-nineteenth-century readers when adjudged spontaneous and heartfelt…Indeed, expectations of human immortality were linked to astronomy's aesthetic and devotional power to form an emotionally and spiritually uplifting catechism. [Thomas] Dick was hardly alone in arguing that studying the heavens was the best preparation for humanity's future explorations of God's universe in the afterlife. If Dick [was] in any sense idiosyncratic, it was only in the degree to which [he] connected [his] astro-theological speculations to specific conceptions of heaven.[276]

Astore's analysis helps to show again just how different Hitchcock's conception of science and religion was from present-day secularists and literalist fundamentalists.

---

[274] William J. Astore, *Observing God: Thomas Dick, Evangelicalism, and Popular Science in Victorian Britain and America* (Burlington, VT: Ashgate, 2001), 30.

[275] Ibid., 215.

[276] Ibid., 216-217.

There is no doubt, however, that Hitchcock was pleased at his ability to convey geological time to a non-specialist audience at a time when such ideas were still quite controversial to the general public. As he wrote to his friend Silliman after the talk,

> I have lately preached a sermon before the Pittsfield Med. Institution in which I have come out with the new views in regard to the first chapter in Genesis. It is now in the press & I hope you will pardon me for referring to your Lectures as an instance of the defense of such views in this country. My statements must be propped up by some good authorities or they will be disregarded since our divines generally do not as you have remarked understand even the elements of the subject.[277]

Hitchcock also tried to popularize some of his scientific ideas with his congregants at the church in Conway. These were combined with a great deal of traditional fire-and-brimstone preaching. Three particular sermons found in his manuscripts illustrate this well: "Noachian Deluge," "Coincidence between Natural Theology and Christianity, in regard to the fallen state of man," and, "Comparison between the knowledge derived from the Scriptures & human Literature & Science," all given between 1822 and 1824, though the sermon on the flood was also repeated in 1831.

In the sermon "Noachian Deluge," Hitchcock employed some of the same arguments that he had used in his 1820 essays, such as the extensive list of comparative mythologies supporting the Biblical account of the Deluge, which take up about ¼ of the sermon. He only briefly referred to geological evidence in one paragraph:

> Whence came those numerous worn & rounded masses of stone which are scattered on the tops of our highest hills and mountains? Surely no river could have conveyed them thither- Nothing will account for their situation but an universal deluge- Let the unbeliever then remember that as he passes over our

[277] Hitchcock to Silliman, 20 October 1823, cited in Robinson, "Edward Hitchcock," 54.

hills the very stones cry out against him.[278]

Hitchcock's main purpose in the sermon was to draw an analogy between the antediluvian world and the world of today, prior to the final conflagration, to help in the conversion/salvation of his congregants. He said that "the salvation of Noah in the ark is a fitting emblem of the salvation of the the Christian by the Saviour Jesus Christ. I do not mean that God brought the flood on the world to prefigure by the deliverance of Noah the rescue of Christians from sin. But there is an accidental and interesting resemblance between the cases."[279]

Hitchcock compared the situation of impenitent men of his time to the antediluvian sinners who did not heed Noah's admonitions. The ark standing open is analogous to Jesus' offer of atonement. Those who do not heed this offer would be destroyed in the fiery flood of the Final Conflagration and go down to hell. He drew a terrifying picture of an unconverted sinner watching as the redeemed saints are "borne above the storm [of the Final Conflagration] in the ark of safety…methinks I see the fiery arrow of almighty wrath engulfing your soul and sweeping you away into the abodes of blackness of darkness forever…The forbearance of God is almost exhausted &…soon that door will be closed & bound against you forever and oh dreadful thought- except you speedily repent the waves of his indignation will roll in everlasting succession over your ruined soul."[280] In Hitchcock's rather unique oevure, fiery revival preaching went hand-in-hand with examinations of comparative mythology and references to geological

[278] Hitchcock, "Noachian Deluge," Sermon no. 128 on II Peter 2:5, January 1823, Hitchcock mss.

[279] Ibid.

[280] Ibid.

developments. They were all part of what he regarded as his service of God.

Hitchcock attempted a slightly more explicit science-oriented approach for his congregrants in his 1822 sermon "Coincidence Between Natural Theology and Christianity in Regard to the Fallen State of Man." Here Hitchcock attempted to go beyond the typical approach of William Paley-style natural theology, which sought to prove the existence and beneficence of God from design in nature. Many evangelicals of the period had reservations about the use of natural theology in apologetics, since the most it could prove was the existence of a God who intervened in nature. It could not substantiate the doctrines of Christianity as such, let alone evangelical Protestantism.[281] Hitchcock claimed that the "analogy between natural & revealed religion does not terminate with the mere existence of God: but extends to other important truths and were we able to look far enough no doubt this analogy would be found to reach to every doctrine & every precept of Christianity."[282] Hitchcock's aim in this sermon was thus to establish the fallen state of humans and the planet through an examination of geology, as well as the physical and mental characteristics of humans. This is an early manifestation of his concept of "The Cross in Nature and Nature in the Cross," where one could find strong testimony in favor of even revealed religion from a study of nature.

---

[281] For evangelical discomfort with natural theology, even among evangelical scientists, see John Hedley Brooke, "The natural theology of the geologists: some theological strata," in *Images of the Earth: Essays in the History of the Environmental Sciences*, ed. L.J.Jordanova and Roy S. Porter, BSHS Monograph 1 (Chalfont St. Giles: British Society for the History of Science, 1979), 39-51.

[282] Hitchcock, "Coincidence Between Natural Theology and Christianity in Regard to the Fallen State of Man," Sermon no. 139 on Romans 1:18-20, December 1822, Hitchcock mss.

Hitchcock's references to geology here included his standard early claims for the evidence of a universal flood-comparative mythological traditions, erratic boulders and marine fossils far inland-used to indicate the proof of a massive punitive phenomenon having taken place in earth history. In addition, Hitchcock referenced the destruction caused by earthquakes and volcanoes, and the fact that the earth contained many regions uninhabitable by man. These phenomena, Hitchcock argued, showed that the earth was in a state unfit for the residence of perfectly righteous beings who had never fallen. That having being said, there *were* fertile habitable regions on earth, and earthquakes and volcanoes had never destroyed the whole planet. "There is enough of security from the volcanoe [sic] & the earthquake to excite our confidence in the mercy of God & our gratitude for his favours."[283] Departing from geology, Hitchcock drew attention to human misery, disease, meat-eating (recall that the Bible first explicitly permits meat after the flood), and the death of innocent infants to reinforce this proof of the fallen nature of mankind.

Hitchcock stated an early opinion on the relationship of human knowledge and science to Biblical truth in his 1824 sermon "Comparison Between Knowledge Derived from the Scriptures and Human Literature and Science." He used a metaphor from Jeremiah 23:28: "What is the chaff to the wheat?" to compare Biblical knowledge with human knowledge. He was not going to "depreciate human learning: for I highly respect it. But it ought to have its proper place, that is, very much below the knowledge of the

[283] Ibid.

word of God."[284] Biblical knowledge, Hitchcock explained, was infallible and instructs people on subjects dealing with eternity, as opposed to temporal conditions. The Bible instructs people on how to obtain everlasting happiness, whereas human art and science only help one's earthly welfare. Scientific discoveries could "indeed throw new light on some parts of the Bible and show us that we miscomprehended its meaning: but they touch not the Scriptures themselves."[285]

Hitchcock's ideal person did not lack knowledge of human science and art. To be sure, he proclaimed that "The most unlettered peasant has learnt more real wisdom from the Bible in a single day than the most learned philosopher has attained in a lifetime of study." He quickly followed that up with a disclaimer: "I am nowhere attempting to depreciate the value of human learning. I speak of it as separated entirely from revelation.- Whenever these are united the beauty of the character is indeed greatly enhanced and there can be no more glorious title than that of a learned pious man but when disconnected and brought into comparison certainly we may justly exclaim- what is the chaff to the wheat."[286] He concluded the sermon with an exhortation for the people of Conway to be more conscientious in setting up Sunday schools and Bible classes to convey divine knowledge to the youth. It is entirely possible that Hitchcock was thinking of himself and his struggle balancing a love for natural history with Christian duty when he exalted the ideal of the "learned pious man."

---

[284] Hitchcock, "Comparison Between the Knowledge Derived from the Scriptures & Human Literature & Science," Sermon no. 243 on Jeremiah 23:28, May 1824, Hitchcock mss.

[285] Ibid, underlines Hitchcock's.

[286] Ibid.

What God hath joined together, let no man put asunder" : The Two Reviews of Buckland's *Reliquiae Diluvianae* (1823-1824)

Two book reviews written by Hitchcock in 1824 provide a striking illustration of his attempts to synthesize religious and scientific knowledge. The reviews were both of the same work, Rev. William Buckland's *Reliquiae Diluvianae*, but they were published in very different venues: *The Christian Spectator*, a Congregationalist periodical, and the *American Journal of Science*, edited by Hitchcock's good friend Benjamin Silliman of Yale. The *Christian Spectator* would be merged with another journal, the *Biblical Repository*, which in turn would be absorbed into the journal *Bibliotheca Sacra*. Hitchcock would write his lengthiest and most important articles on science and religion in the *Spectator* and its various successors.

Even before his *Reliquiae* review, Hitchcock had published several works on theology and nature in the *Spectator*, including a piece on "A General Survey of the Works of God." This employed *Utility's* motifs of justifying nature study through appeals to Job and Solomon, as well as doing science in the afterlife, without referring to an ancient earth. In *Reminiscences*, Hitchcock described his two reviews as "entirely different" from each other.[287] The reviews show how Hitchcock addressed a central topic in science-religion reconciliation in both religious and scientific venues. In addition, the reviews indicate that Hitchcockhad formulated his second, "Bucklandian" view of Noah's flood.

As Hitchcock quotes copiously from *Reliquiae* in his reviews, a summary of

[287] Hitchcock, *Reminiscences*, 387.

Buckland's work is in order. *Reliquiae Diluvianae* was a survey of caves and other geological features of Britain, Germany and to a lesser extent the rest of the world. The purpose of the work was to demonstrate that a massive deluge had reshaped the earth's surface relatively recently. Buckland was cautious about definitely relating the deluge to Noah's flood, but he regarded this as a strong inference. The Bible was hardly mentioned in the work, but the overall purpose of *Reliquiae* was to show that geology did not endanger religion. Buckland thought that his survey, "by affording the strongest evidence of an universal deluge, leads us to hope, that it will no longer be asserted, as it has been by high authorities, that geology supplies no proofs of an event in the reality of which the truth of the Mosaic records is so materially involved."[288]

A startling discovery caught Buckland's attention in 1821, and motivated him to write *Reliquiae Diluvianae*. This was the discovery of the fossils of Kirkdale Cave, located in Yorkshire. The bones, covered with a hardened mud, were a mixture of remains of many types of animals, most of which were only found in living form in the tropical regions of the world. The bones of hyenas were particularly well represented. Buckland posited that Kirkdale Cave had been a den of hyenas in the period just before the Flood, and that the bones of most of the other animals there were the remains of the hyenas' prey. The presence of tropical animals meant that there was at least a possibility that England had once been tropical, that the world's climate had changed over millenia.

Buckland further examined the sediment covering the fossils, and concluded that this mud could only have been produced in the cave by a massive flood. He described

[288] William Buckland, *Reliquiae Diluvianae; or, Observations on the Organic Remains Contained in Caves, Fissures, and Diluvial Gravel, and on other Geological Phenomena, Attesting the Action of a Universal Deluge.* London: J. Murray, 1823; reprint, New York: Arno Press, 1978), iii.

caves of other locales, and examined such features as layers of mud and types of fossils to determine whether the cave's material dated to a period before or after the Deluge. The most important element of each study, though, is its confirmation of the Deluge, and hence implicitly of direct Divine supervision of the world (though not beneficence in this case). The unusual geological surface features (large gravel moraines, extensive mud layers in caves, erratic boulders) found in Europe and North America demanded an explanation. The power of a great flood could have caused those features to appear. Thus, Buckland concluded that both nature and scripture testified equally to the occurrence of a great Deluge.

Hitchcock's review in the *Christian Spectator* is far more explicitly religious and polemical than the corresponding review in the *American Journal of Science*. In the first case, he began with a resounding general praise of Christians who used infidels' best "weapons" such as science and the printing press against them. "This was, in fact, merely restoring these weapons to their legitimate proprietors, and bringing them into that service for which they were intended…those copies of the scriptures which issue from the very press employed by Voltaire to print his blasphemies, are not thereby rendered the less pure or perfect. Indeed, since 'the children of this world are in their generation, wiser than the children of light,' Christians have learnt to profit by that superior wisdom, and to seize upon those plans for the defence and extension of revealed truth, which worldly sagacity had invented for its destruction."[289] Hitchcock vigorously defended geology as having corroborated the truth of the Bible as much, if not more, than any other science.

[289] Hitchcock, "Review of Buckland's *Reliquiae Diluvianae*," *Christian Spectator* 6, no. 8 (August 1824): 415-416.

Hitchcock warned readers not to be put off by the title, *Reliquianae Diluvianae* (Relics of the Deluge), thinking that it was connected to the old cosmogonical hypotheses of the previous two centuries. Rather, Buckland's work was "written in the cautious inductive spirit of Bacon and Newton, and is well calculated to do away with every lingering prejudice against [geology]…"[290] He then explored the various opinions of past thinkers on what remnants of the Flood were extant. Hitchcock again emphatically spoke against attributing solid stratified rock layers to the Flood. He also noted that Buckland's discoveries of antediluvian hyena dens demonstrated that today's continents were in fact *not* the antediluvian seafloor (thus implicitly repudiating his own earlier view).

Hitchcock gave an exhaustive summary of Buckland's work, including many long quotes. He enthusiastically approved of almost all of *Reliquiae*. The only part that he criticized was Buckland's reluctance to clearly say that the deluge he identified *was* Noah's flood. "The diluvial catastrophe, then," he concluded, "by which the Kirkdale hyaenas were destroyed, and the mud in the cave deposited over the bones, agree in point of time with the deluge of Noah. We regret, however, that Mr. Buckland is not more full upon this point; and we think he has not given us the evidence upon it with his usual clearness and felicity."[291]

Hitchcock concluded the *Christian Spectator* review with a summary of support for the veracity of Noah's flood from comparative flood legends, which will now be familiar from his early sermons, essays, and *Utility of Natural History*. He urged travelers

---

[290] Ibid., 417.

[291] Ibid., 426.

to examine caves they encountered in the United States to compare their contents with Buckland's discoveries at Kirkdale. Finally, he finished with yet another amalgam of piety and Baconianism.

> A hypothetical Geology has long been the boasted vantage ground of infidelity: But the geology of facts is found more and more to speak the language of revelation. Indeed, revelation and creation are the work of the same God, and although the ignorance and prejudice of man have succeeded, in some measure, in setting them in array against each other, yet this will serve only to render their final and fast approaching union more beautiful and firm.[292]

Hitchcock's review in the *American Journal of Science* stressed facts and Baconianism still more than in the *Christian Spectator* review, and deemphasized religious aspects somewhat. However, he still referred to geology's corroboration of revelation. In the *Journal*, as in the *Spectator*, he reassured his readers against "alarm…lest Newton and Bacon are about to be abandoned, and they are to be mounted on the Alborak [Muhammad's winged horse] of Burnet, or Whiston, or Hutchinson [early modern cosmogonists]. But we can assure such persons that these fears are entirely groundless."[293] He then gave a brief overview of views on the Flood and science from the 1600s and 1700s. In particular, he criticized the contemporary Biblical literalist Granville Penn, who believed that old-earth geology and geologists in general were conspiring against Christianity. Hitchcock responded to Penn in a manner both Baconian and Christian. He granted that Penn was in general a "good scholar, who is well versed in philology, and who has read most of the modern treatises on geology: but really we do not fear to hazard the assertion, that he has not seen much of rocks in their native

---

[292] Ibid., 436.

[293] Hitchcock, "Notice and Review of the *Reliquiae Diluvianae*," *American Journal of Science* 8, no. 1 (January 1824): 150.

beds."[294] Hitchcock would often accuse geology's critics of not having hands-on experience with rock layers. He then responded passionately to Penn's claim that geologists are opposed to religion:

> [W]e can assure him, that there are very many [geologists]…who do not merely give their assent to the truth of revelation, but whose whole hope rests upon it; whose attachment to it is stronger than death, and who count it their chief glory and happiness, to defend and enforce its glorious truths:-men, who rejoice to see in every rock formation the marks of a creating and upholding God; and are they to be accounted atheists, because they happen to differ from Mr. Penn in regard to the mode in which creating energy was exerted? We sincerely protest against any such efforts to divorce science from religion. What "God hath joined together, let no man put asunder."[295]

Hitchcock then proceeded to describe Buckland's discoveries and conclusions. He concluded the review in the next issue of the *AJS*, describing Buckland's analysis of caves on the European continent similar to Kirkdale. In particular, Hitchcock adopted Buckland's term *diluvium* for the geological deposits of gravel, erratic boulders, and mud attributable to the deluge (whether or not it was in fact Noah's flood, as asserted by Hitchcock and skirted over by Buckland). Hitchcock felt that this stratum should be sharply distinguished from surface deposits left by rivers and other sources after the flood (alluvium).

Hitchcock finished the article with a nonreligious call to American geologists to explore diluvial formations in the United States. He complained that "Our geologists, with a few exceptions, are unable to meet the expense of fine type, paper and engravings [as *Reliquiae* had]. The same cause prevents them from devoting so large a portion their time to geological enquiries as they could wish. Better times…seem to be dawning

---

[294] Ibid., 154.

[295] Ibid., 155.

among us, and geology begins to be fostered in most of our colleges and by wealthy individuals."[296] Hitchcock was probably considering a career in geology at this point; he began his professorship in geology within two years of the review; hence, the concerns expressed here are eminently practical. In sum, the *Journal* article had a more toned-down and defensive tone when it mentioned religion than in the *Spectator* (possibly due to Silliman's editing). Nevertheless, Hitchcock included both scientific erudition and religious fervor in both reviews.

Hitchcock would publish relatively little on science and religion between 1824 and 1835, which is understandable, due to the fact that he began his professorship at Amherst in 1825, which increased his duties. He wrote a few manuscripts, such as the "Geology of the Bible," from the late 1820s. This can be regarded as both a follow-up to his initial 1819-1820 essay and an early version of the arguments he would use in his articles of the late 1830s. Hitchcock continued to write these types of essays as variations on the same themes for the rest of his life. In the manuscript copy, he continued to argue for gap theory, and a flood theory now attuned to Buckland's, in which current continents were drowned by a massive flood current coming from the north. Even Cuvier had now recanted his own ideas of sea and land changing place at the Deluge in favor of this model. Evidence of Noah's flood could be found in the formations now termed *diluvium*. As always, he concluded the manuscript with an ecstatic look to the future, this time in a temporal sense. After science and religion were reconciled, "the Gospel [will] advance from conquest to conquest until the wilderness is cleared away to its farthest verge ; and ~~the last~~ all its baneful fogs & miasmas have been exhaled. Then, as the last cloud of

[296] Ibid., pt. 2, *American Journal of Science* 8, no. 2 (January 1824): 338.

unbeleif [sic] passes away & its thunders die upon the ear, there will be seen ~~upon its~~ upon its retiring darkness the [rain]bow of Christianity, blending its colours with the bow of science:- a happy prelude of the millenial day."[297]

As Hitchcock worked on the geological survey of Massachusetts during the first half of the 1830s, he made this identification of the deluge which had deposited diluvium (the moraines, mud, and erratic boulders) with Noah's flood still more exact. After discussing the topography and occurrence of diluvium, he concluded that these deposits must be the result of a great deluge. He then addressed the question of whether the deluge was Noah's flood, answering in the affirmative. Although I have noted above that Hitchcock waxed passionately romantic in the "Scenographic" sections of the survey, he did not address specific points of Christianity in them, aside from generic references to the love of God inspired by nature. Here too, Hitchcock addressed the question of Noah's flood without allusion to its moral meaning.

> I have already remarked that this question can have no very great interest as bearing on the veracity of the sacred historian; since nearly all geologists agree that their science exhibits no evidence against [its] occurrence…Yet, as it is a characteristic of human nature to go from one extreme to the other, and as it hs been customary to impute almost every geological change to the deluge of Noah, is it not probable that philosophers, disgusted with so much false reasoning on the subject, will be apt to overlook even creditable geological evidence of that event? I have shown…that the last deluge in Massachusetts was universal, and that it was comparatively recent. The deluge of Noah is described as universal over the globe; and historical records give us no account of one more recent. Where then is the objection against considering them as identical? Until some substantial reason can be given against [this], is it not unphilosophical to refuse to admit it? [298]

---

[297] "Geology of the Bible," ca. 1828, Hitchcock mss., corrections Hitchcock's.

[298] Hitchcock, *Report on the Geology, Mineralogy, Botany, and Zoology of Massachusetts*, 2nd ed. (Amherst: J.S. & C. Adams, 1835), 172-173.

Rodney Stiling, using creative imagery, concludes from this statement that "Hitchcock had convinced himself and his colleagues that geological evidence for the biblical Flood lay right under their feet. His program to persuade American geologists to adopt a new nomenclature [i.e. to differentiate diluvium from alluvium] and to undertake new efforts to confirm scripture with science was largely successful. Hitchcock's work in his 1835 *Report* represented the high-water mark for the diluvial theory of the Genesis Flood in the United States. Appropriately, this tide crested in the achievements of the man who originally loosed it."[299]

In a larger sense, I have concluded from several sources that Hitchcock seems to have had to restrain himself from bursting out with even more explicitly Christological references even in his scientific works. One piece of evidence is the letter to Silliman on p. 113, where even the devout Silliman believed he had to edit some of Hitchcock's religious remarks out from his *Journal*. Another is Hitchcock's critique of scientists who seemed to convey a non-religious tone in their work. For instance, in reviewing 3 works on geology for the *Christian Spectator*, he concluded with such a criticism: "We have, indeed little evidence that these authors are hostile to religion…[b]ut we do not see how a man can write a book, taken up in detailing the most stupendous operations of the Deity, and yet make no allusion to his existence and agency."[300] He contrasted the style of the first two authors with the third geological work, by Silliman, which did allude to God.

---

[299] Stiling, "The diminishing deluge," 100-101.

[300] Hitchcock, "Review of works on the Structure of the Earth," *Christian Spectator* 11, no. 3 (Sept. 1829): 480. For another example, where Hitchcock complained to Silliman about British geologist Charles Lyell's lack of religious references in Lyell's geological texts, see Robinson, "Edward Hitchcock," 67.

For Hitchcock, religion and science truly could not be put asunder.

"The Digging of Rocks and the Digging of Hebrew Roots": Philology and Geology in Combat (1835-1836)

Between 1835 and 1838, Hitchcock wrote a series of articles on geology and religion for the Congregationalist journal *The Biblical Repository and Quarterly Observer* (which would become *The American Biblical Repository* in 1838). The articles were largely an amplification of his earlier sermons and essays, explaining in much greater depth the connection between geology and knowledge of God and the exegetical case for geological time. Hitchcock's articles aroused opposition from Professor Moses Stuart of Andover Theological Seminary. Stuart was probably the greatest expert in the study of Hebrew and related languages (such as Aramaic) in the United States. Although he was a theological conservative, Stuart helped introduce biblical criticism to American Protestant scholarship. As Noll says, "[Stuart] probably held more of the Scriptures in his head, and discerned with the eye of his mind more connections among passages of Scripture, than any American since Jonathan Edwards."[301] Both Hitchcock and Stuart were devout Congregationalists. Their dispute was not between progressive reason and blind faith, but rather on the more limited topic of whether science or Hebrew philology could provide a true understanding of Genesis 1-2.

In the first article, from January 1835, "The Connection Between Geology and Natural Religion," Hitchcock indefatigably set out once again to defend geologists from accusations of infidelity. He attempted to prove that geology actually buttressed many of

[301] Noll, *America's God*, 306.

religion's claims, at least in the area of natural religion (God's existence, power, and goodness). Hitchcock argued that geology proved the extinction of entire systems of past life, and showed that the earth's temperature was much greater in past eons, so much so that at its beginning it must have been in a molten state. This, claimed Hitchcock, was a clear refutation of those philosophers who held that the earth and its life had existed eternally. Geology demonstrated the neccessity of creation as an explanation of the existence of life. He scornfully dismissed the possibility of evolution: "[The creation of new life forms is] the highest and most astonishing exercise of creative power: and if that power can be supposed to reside in the laws of nature, it seems to us that there is no phenomenon in the universe that will require a higher power: and we are reduced at once to materialism and atheism."[302]

Hitchcock also reasoned that geology provided proof of God's special intervention in nature for the good of all creatures, and humans in particular. God's creation of new forms of life in prehistory after catastrophic mass extinctions was surely an irrefutable example of intervention. In addition, God had lovingly provided for humans by arranging the structure of the earth so that useful metals and rocks were available on the surface and not buried in the core. The development of coal from plant remains in the Carboniferous Period was a particularly powerful example of this: "We see in [the provision of coal] the providence of a kind Father, laying up a store for the support of his future offspring…What seems superfluous now, or ill adapted to our present condition, may be intended for the comfort and happiness of other beings millions

[302] Hitchcock, "The Connection Between Geology and Natural Religion," *Biblical Repository and Quarterly Observer* 5, no. 17 (Jan. 1835): 117-118.

of ages hence."[303] In a tone that seems almost Panglossian to the modern reader, Hitchcock defends the destruction unleashed by volcanoes as necessary to relieve pressure on the inner earth and prevent the planet from exploding. Seemingly monstrous beings like prehistoric sea reptiles were lovingly adapted by God to the conditions then prevalent on the earth.

Hitchcock also employed a motif that dates back to his 1819-1820 essay, that the vast scope of geological time and events exalts and expands our conception of God's plans for the universe. He would elaborate on that motif in more detail in *Religion of Geology*. At the end of this essay, Hitchcock summarized all the arguments that he had made as being "the religion of geology. Prejudice may call it atheism, because it presents before us views so new and peculiar; and scepticism may pervert these views to suit an unsubdued and unholy heart. But we call this religion a transcript of the Divine Perfections."[304]

Hitchcock then published a two-part article for the *Repository*, "The Connection Between Geology and the Mosaic History of the Creation." The first part, from April 1835, showed what agreement existed between geology and Genesis; and the second, from October 1835, attempted to resolve the supposed discrepancies. Interestingly, the article describing the similarities was only 12 pages long, but the one dealing with the problems was 72 pages. One of the points Hitchcock made in the first article was that scholars who were "merely theologians, or merely philologists, or merely geologists…[approached Genesis-geology issues]. […]But it is quite clear to us, that

[303] Ibid., 126.

[304] Ibid., 138.

without at least a respectable acquaintance with them all, no man can successfully discuss their connection, or reconcile their apparent discrepancies."[305] The implicit message was that *Hitchcock* was indeed a man of such expertise, which cannot have failed to annoy Stuart. He also complained about the lack of adequate geological education in America.

In discussing the agreements between Genesis and geology, Hitchcock adopted a typical pre-Darwinian "two books" approach, in which Nature, the Book of God's Work, could not possibly be in true contradiction with the Bible, God's Word. He pressed the point that geology demonstrated the world's non-eternity. He added that geology agreed with the Bible that the structure of the earth had been formed mainly through the actions of fire and water. Hitchcock also endorsed the view that the present-day continents had originally been covered by water, as indicated on the third day of Genesis. He did *not* mean that today's continents were under water immediately prior to Noah's flood, a view which he had abandoned more than a decade prior to this article. Hitchcock claimed that both the Bible and geology represented the development of the planet in stages, in a progressive fashion, regardless of the time such development took. Hitchcock insisted that the lack of human remains in all but the most recent strata showed that man was the most recent animate creation. Hitchcock also noted that the evidence for *a* global flood, at the very least, provided "presumptive evidence" in favor of the occurrence of Noah's flood. Finally, geology, through the discovery of an immensely hot inner core to the earth, had discovered the mechanism through which the earth would be destroyed at the Final Conflagration-a great outpouring of magma.

Hitchcock's declarations of the similarities between Genesis and geology appear

[305] Hitchcock, "The Connection Between Geology and the Mosaic History of the Creation," *Biblical Repository and Quarterly Observer* 5, no. 18 (April 1835): 440.

forced to modern ears once again. However, they fit perfectly well in the social/religious milieu described by Astore above. The second installment of Hitchcock's article for the *Repository*, dealing with the seeming contradictions between Genesis and geology, was taken in some part from his 1829 manuscript essay *Geology of the Bible*. For instance, the manuscript's closing phrase about the rainbow of Christianity combined with that of science driving away the clouds of unbelief is used almost verbatim in the published essay. Hitchcock began the essay with a general presentation of geological facts, such as the great depth of strata, and the inferred vast time it would take to deposit them. Therefore, he warned, "[w]e must meet this difficulty in some other way than by denying the facts."[306] Hitchcock appealed to the discoveries of astronomy to show that the Bible could indeed be speaking in terms of "optical" and not "physical" truth when describing, say, the sun "setting." He then went through an exhaustive list of disputes on the plain meaning of Genesis, such as whether the sun was created on the first or fourth day. The purpose of his doing so was to establish that Genesis 1-2 was a subject of exegetical difficulty. He brought in his typical Baconian rhetoric to insist that geology was now based on solid facts, and not airy speculations.

Hitchcock then analyzed possible solutions to the difficulties of Genesis. He vehemently rejected the idea that the masses of fossiliferous strata had been created instantly in their present form. Accepting this would lead to the abandonment of all analogical reasoning, as it would then be impossible to distinguish between those remains which were of actual organisms and were post-Genesis, and which were instantly created. The creation of never-alive pseudo-fossils would be a strange waste of creative power by

[306] Ibid. [part 2] *Repository* 6, no. 20 (October 1835); 265.

God. He also rejected those who claimed that the word "bara" in Hebrew, which means "create" and is used in the first sentence of Genesis, does *not* mean creation *ex nihilo*, but rather from some pre-existing matter. Hitchcock preferred to locate geological time *between* the first and the second verse.

Hitchcock admitted the possibility that the Creation days were actually eras, noting which exegetes had supported that in the past. Benjamin Silliman had adopted the Day/age view. Hitchcock rejected Day/age theory for several reasons, among which was his claim that Genesis was not to be taken as metaphorical or poetic, but as plain history. In that sense, he was a biblical literalist. From this perspective, terms like "yom" (day) "erev" (evening) and "boker" (morning) should be taken at face value. "[Genesis's exegetical] difficulties result from its great brevity and extreme simplicity, rather than from any occult and marvellous truths contained under figurative language."[307] Hitchcock cited some of Moses Stuart's works on Hebrew in support of this plain-sense reading. He also noted that the geological record of the appearance of plants and animals did not accord with the order described in Genesis.

In an astonishing display of rhetorical agility, Hitchcock then turned around and tried to justify gap theory through an impassioned appeal to the malleability of the hebrew letter vav, which when used as a prefix, usually means "and." The second verse of Genesis reads, "Now the earth as unformed and void, and darkness (was) upon the face of the deep; **and** the spirit of God hovered over the face of the waters." Hitchcock argued strenuously for this interpretation as doing the least violence to the text, and allowing for all of geological time as well as preserving a literal six-day period for the creation of the

[307] Ibid., 304.

present order of nature. To justify this, he argued that the "vav" prefix could be construed to mean **afterwards**, therefore implying a previous order of nature postdating God's creation of the universe. Hitchcock cited various exegetes in support of the multiple possible meanings of "vav" as a prefix. He also claimed that the Hebrew words "tohu va-vohu" were better translated as "waste and desert" than as "without form and void," which implied that both the laws of nature and the planet existed prior to the creation days.

Hitchcock listed and quoted those clergymen who supported gap theory, especially Scottish theologian Thomas Chalmers and Hitchcock's fellow geologists Buckland and Sedgwick. Hitchcock responded to the objection that prehistoric life would have been without light prior to the creation of the sun, that all celestial objects were probably created along with the heavens on the first day. On the fourth day, "[heavenly] bodies had their offices and stations assigned them: in other words, that the present arrangement of things in the heavens was then first completely established."[308] Hitchcock concluded the essay with a declaration that, whatever the difficulties, "it would be premature, in the present state of geology and of sacred philology, to infer any real discrepancy between them."[309] He added to that his by now standard references to geology enlarging and exalting Christians' ideas of God's plans and benevolence, and the impending end of unbelief.

Moses Stuart published a blistering response to Hitchcock's ideas in the *Repository* in January 1836. He began in a conciliatory fashion, thanking Hitchcock for

[308] Ibid., 325.

[309] Ibid., 327.

his article and commiserating that philologists were also suspected of infidelity for their study of biblical scholarship outside of American Calvinism. He also assured Hitchcock that he did not regard him in any way as an unbeliever. He then launched his attack on Hitchcock's exegesis. Stuart's fundamental objection to Hitchcock was his privileging of science over Hebrew philology in determining the true meaning of Genesis. This was in essence a battle over academic turf.

Stuart insisted that "I am unable to see how the discoveries of modern science and of recent date, can determine the meaning of Moses' words. Nothing can be more certain, that that the sacred writers did not compose their books with modern science in view, or indeed with any distinct knowledge of them."[310] The Biblical writers described natural phenomena in a "popular" manner of speaking, as people today speak of the sun as rising or setting (without being inaccurate with regard to the truth of those phenomena). "[M]odern science not having been respected in the words of Moses, it cannot be the arbiter of what the words mean which are employed by him."[311] Stuart insisted that philology, the expert knowledge of Biblical Hebrew, was the *only* legitimate means of determining the meaning of Genesis. He mocked any attempt to use modern science to alter its meaning as being comparable to using the condition of modern Greece or Italy to interpret the *Iliad* or *Aeneid*. He criticized the British geologist Sedgwick for regarding himself as an expert on philology, and therefore being an almost infallible authority on science and religion (and inferentially applied that same critique to Hitchcock as well).

---

[310] Moses Stuart, "Critical Examination of Some Passages in Gen. I.; With Remarks on Difficulties that Attend Some of the Present Modes of Geological Reasoning," *Biblical Repository and Quarterly Observer* 6, no. 21(Jan. 1836): 49.

[311] Ibid., 51.

Stuart then listed a large number of complex arguments about the nature and use of Hebrew words for "day" and "create" that, he claimed, indicated that the meaning of Genesis 1 was in fact not subject to virtually any *philological* controversy as per the geologists. Perhaps most scathing was his attack on Hitchcock's translation of the "vav" prefix as "afterwards," not "and," given the supposed grammatical malleability of this Hebrew letter. "Are there any of the megalosauri, iguanodons, or mastodons of the new geology, that exceed the magnitude of such a conjunction? *Vav* has often been called a *Proteus* before…but never before was I aware that this Proteus had become so large as to cover more ground than Typhoeus of old. […] *Vav* supplying the place of all the conjunctives and disjunctives of the Hebrew language! A singular people, indeed, the Jews must have been, to have coined so many other words as they have done, in order to designate the different lights and shades of these classes of words."[312]

Stuart contended that an accurate reading of the first chapter of Genesis would indicate that there was no light created until the first day. He suggested that light was diffused throughout the universe prior to the creation of the sun, and so was available for the plants on the third day. He even marshalled evidence from the *modern* theory of light being a wave for this view (ironically). Stuart was completely incredulous that a geological catastrophe such as a pre-Adamic flood could have extinguished prehistoric stars or light, and so therefore the existence of any life in the gap between the creation and the days of its organization would be impossible, as it would have lacked both light and heat to survive. He also tried to stress the phantasmagoric nature of prehistoric life, and the absurdity of supposing that prehistoric organisms were all created and died within

[312] Ibid., 61, italics Stuart's.

the first twelve-hour night of Genesis. He also pointed to the problems for the Day/age theory, such as the command in Exodus to observe the Sabbath "because in six days the Lord made heaven and earth and all that in them is." Were Jews supposed to keep the Sabbath for an indefinite period of geological time? Despite Stuart's conciliatory opening words, he was clearly incensed at the presumptions of many geologists.

Stuart also attempted to show that geology was still in its infancy and its conclusions were very uncertain. As an example, he cited Charles Lyell's new doctrine of uniformitarianism, and how it supposedly showed that the theories of catastrophists such as Buckland and Cuvier were "dreamy phantasms."[313] He doubted the reality of the extinction of supposedly prehistoric life, given that many current plants had descended from different ancestors which still existed. (This seemed to advocate evolution in some form, which Hitchcock avidly seized upon in his response to Stuart). Stuart cited various reports of human remains in strata from the Secondary Period to break down the idea of different succeeding systems of prehistoric life. Finally, he resorted to aesthetic disgust for the conclusions of geologists.

> [T]o think of 200,000 years for snails…and lizards, and crocodiles, and alligators, and dragons, and the like! Thousands of ages, then, the world was without a lord or a head. The image of God, whom he constituted his viceregent here below, for myriads of ages not created! His dominion put off for thousands of centuries, before it began to exist! And who, all this time, were the actual lords of the creation? Lizards and alligators of more than Typhoean dimensions! When I think soberly of such a picture, I feel constrained to turn away with unspeakable loathing. I am forced to exclaim: 'Is it true then, Creator of heaven and earth, that in *wisdom* thou has made all things?'…A world without*man* , will always seem to me like a body without a head, a planetary system without a sun. Is not such a world a creation of insignificant and contemptible existences, instead of the images of the living God?[314]

[313] Ibid., 85.

[314] Ibid., 100-102, italics Stuart's.

Stuart concluded his article with a plea to geologists not to malign or laugh at him for his honest doubts, for the United States was still a free country, where people could express their opinion honestly. He warned that "those who bear hardly upon others for meddling for their *geology*, should keep a good look out how they meddle with Hebrew *philology*. The digging of rocks and the digging of Hebrew roots are not as yet precisely the same operation, and are not likely soon to be."[315] It is clear from the article that Moses Stuart resented geologists' pronouncements on Hebrew far more than their general ideas about the age of the earth. As half a century of scholarship has shown, the conflicts over Genesis and geology in the mid-1800s cannot be reduced to a clash of science and religion; in many ways this was an internecine war.

Stuart's attack on geology was certainly not unprecedented, but rarely had it come from a figure so expertly versed in Hebrew and related languages. Hitchcock responded in April 1836. Interestingly, Stuart never published a surrejoinder, and the conflict between the two men ended there. It is likely that this is because the conflict was not personal, but dealt with larger professional issues (note that Stuart spent much of the article savaging Sedgwick rather than Hitchcock). In contrast, the dispute between Hitchcock and James Deane over the first recognition of the importance of fossil footprints became truly venomous and persisted even after Deane's death.

Hitchcock's response to Stuart began in a conciliatory fashion, reminding readers of how much they shared, such as a common belief in the infallibility and inspiration of the Bible. However, Hitchcock strenuously objected to the mocking tone of Stuart's

[315] Ibid., 106, italics Stuart's.

rhetoric. "By…interlarding sentences with exclamation-marks, and parentheses pregnant with wit, it is easy to get a momentary laugh against any subject."[316] Hitchcock immediately attacked Stuart's deprecation of modern science's role in interpreting the Bible. He cited the case of heliocentrism, in that the entire Christian world before Copernicus had been certain that the earth was stationary and the sun revolved around it. He cited Francis Turretin, a distinguished Protestant theologian from the late 1600s, who still argued strenuously for *geocentrism*, to show that only conclusive scientific proof had caused religious scholars to interpret the Biblical passages referring to a moving sun as referring to "optical" truth.

Hitchcock noted Stuart's appeal to modern science to show how light would have predated the sun as showing that Stuart was straying from his own insistence on philological interpretation alone. In addition to that, he tried to show how Stuart had misunderstood the wave theory of light. Hitchcock also showed that although Lyell disagreed with catastrophists on the allowability of causes of greater intensity than currently known in geological time, they *all* agreed on the immense length of that time. He referred Stuart to a number of advanced geological works to show him that geologists did unanimously agree on many basic principles. He also found Stuart's contempt for prehistoric life distressing, and responded with a typical declaration of the wisdom of God manifested through nature. He did not feel loathing when contemplating huge prehistoric reptiles, but simply reverence for God's wisdom. Hitchcock chided Stuart for "turning away from the picture of this world which, although man was not yet placed

[316] Hitchcock, "Remarks on Professor Stuart's Examination of Gen. I. in Reference to Geology," *Biblical Repository and Quarterly Review* 7, no. 22 (April 1836): 451.

upon it, teemed with happy existences exulting in their Maker's beneficence. When shall we learn that man's proper business is to find out what God *has* done instead of deciding what he *ought* to have done!"[317]

Hitchcock attacked Stuart's anti-geological assertions vigorously, especially the claim that human remains had been found in supposedly very ancient strata. In most of those cases, the remains were found in a grotto of Secondary rock, covered with much more recent mud. Capping this, Hitchcock replied that attributing such fossils to the Secondary Period was like asserting that all pupils currently at Stuart's Andover Seminary had been in it since its foundation. Hitchcock's trump card in terms of Stuart's lack of scientific background was his seeming backing of evolutionary theory referred to above. He regarded Stuart as having a position even more untenable than Lamarck, in that Stuart did not even insist on long periods of time for the transmutation of species. "It may, perhaps, be said, that professor Stuart cannot have intended to avow and defend so absurd and dangerous an hypothesis; and that he cannot have meant that his language should be understood in its literal and scientific sense. So I hope it might prove…Such [in addition to created-as-if-old and all strata deposited by Noah's flood] are the leading theories which professor Stuart would have us substitute for those of the geologists, I leave the intelligent reader to take his choice between them."[318] Hitchcock ended his response with an impassioned declaration to infidels and Christian literalists alike that Christian geologists would never give up the Bible, and that there was in truth no discrepancy between science and religion. Hitchcock's motifs of religion and appeal to

[317] Ibid., 470-471.

[318] Ibid., 485.

reason were on full display in his response to Stuart, although Christological and romantic references were scanty. He responded to Stuart by giving him examples of Biblical interpretation affected by modern discoveries, and also pointing out his factual errors. Above all, he tried to show that geologists did not differ from other Christians in their regard for the truth of the Bible. Perhaps one can detect some romanticism in Hitchcock's fond regard for prehistoric reptiles as evincing God's designing wisdom. The vehemence of Hitchcock's response to Stuart can well be accounted for by the fact that Stuart was attempting to pry apart science and religion, however slightly.

Chapter 4: The Culmination of Hitchcock's Science-Religion Synthesis in *The Religion of Geology* and response to "Creation by Law" [Evolution] (1837-1863)

Hitchcock's Mature Thought Emerges; A Partial Flood and *The Religion of Geology* (1837-1851)

After the end of Hitchcock's exchange with Stuart, he tackled the subject of Noah's flood in great depth in the *Biblical Repository*. He wrote a massive 127-page article, "The Historical and Geological Deluges Compared." Hitchcock's article, published in three separate issues, was a turning point in his views on the Flood, and indeed embodied his third distinct view of the Flood (according to Stiling). The new model would best be described as "modified Bucklandian." Here, Noah's flood was clearly distinguished from the flood that deposited the phenomena collectively known as diluvium, termed the "Geological Deluge." It occurred prior to the creation of Adam. Both the pre-Adamic and Noachic floods were extremely extensive, covering a great portion of the Earth's surface, if not the whole of it. The first installment of the article initially went over ground that Hitchcock had covered many times during his career. Hitchcock seemed to be quite repetitious in his work, and even commented in *Reminiscences* that he had written too much overall. This was a description of Noah's flood, as well as the usual list of flood tales from all countries that supported its occurrence. Hitchcock then listed all the theories on the nature of the Flood from antiquity until the present day (1837). Clearly, he was striving for a comprehensive

account here. Hitchcock's mature thought on science and religion can probably be dated to this article.

Hitchcock interspersed his history of diluvial theories with attacks on physico-theologists of the early modern period and his contemporaries, such as Granville Penn, who embraced a Noah's flood that deposited all strata. Hitchcock unwittingly anticipated the attitudes of modern literalists when he thus claimed that "It is not necessary to go into a formal exhibition of the absurdity of such views as these. For unless a new school of physico-theologists should arise, and geological science as well as biblical criticism, should revert to their condition one hundred years ago, they will not be adopted."[319] Hitchcock lamented that the effect of such works would be to prejudice many unlearned Christians against geologists and skeptical geologists against Christianity.

Hitchcock and other distinguished geologists, such as Buckland and Sedgwick, were now beginning to reject the identification of the flood that had deposited the diluvium with Noah's flood, in large part because no human remains that could indisputably be described as having been deposited in the diluvium had yet been found. Hitchcock cited Sedgwick's recantation on that point. Nonetheless, none of these clergyman-geologists ever abandoned the *fact* that Noah's flood had occurred; only the idea that its remains were evident all over the earth. Hitchcock summarized the views of contemporary geologists as falling into 3 categories: First, those who denied the occurrence of any worldwide flood; second, those who held by a worldwide flood before Adam, and viewed Noah's flood as local; and third, those who held that many extensive, nearly universal floods had inundated the earth, the last of which was Noah's. Hitchcock

[319] Hitchcock, "The Historical and Geological Deluges Compared," *Biblical Repository and Quarterly Observer* 9, no. 25 (January 1837): 103.

was at this point wavering between the second and third opinions. He closed this first installment with a slightly sheepish allusion to its length: "[W]e doubt not that our readers as well as ourselves will by this time be gratified with a hiatus."[320]

Hitchcock continued his flood article in October 1837. He argued once again against the theories that held that the flood had deposited all strata. He had been arguing in this fashion since 1819. He included a striking new feature after this, though. Given his gradual decoupling of a pre-Adamic deluge from Noah's flood, he claimed that there might be no traces of Noah's flood now remaining on the earth. By traces, he meant geological features whose origin could definitely be ascribed to Noah's flood. This was different in the extreme from his rhetoric in his Conway flood sermon and *Utility of Natural History* of the "stones cry out against the unbeliever" type. All Hitchcock was willing to admit now was that proving that *a* deluge had taken place relatively recently, pre-Adamic or not, furnished *presumptive evidence* in favor of the occurrence of Noah's flood, and (as usual!) there was absolutely no collision between geology and Scripture. Once more, Hitchcock described the prevalence of diluvium in North America and Europe, this time informed in even greater detail by his geological survey researches. For the first time, he raised the possibility that some sort of ice mass might also have deposited the diluvium, but he quickly dismissed it in favor of a water deluge as the main cause.

Hitchcock again apologized for the article's length fearing that "our readers will be quite wearied out by so many details. But we do not suppose that any one can form a correct opinion on this subject without a pretty extensive acquaintance with facts; nor are

[320] Ibid., 139.

we aware that such a summary of them as we have now presented can be found; indeed, many of them have never before been made public."[321] Hitchcock concluded the second installment of the article with a list of possible causes of diluvial phenomena, and his cautious conclusion that the land's inundation by *a* (almost certainly pre-Adamic) deluge was the most likely cause, although not free of difficulties. At this point, the article ended abruptly, cut off by the editor, who said that "We regret that our limits will not permit us to conclude the above article in our present number."[322]

Hitchcock devoted the final installment to two topics. First, he put out a brief description of diluvial phenomena in caves (with a statement to the effect that Buckland had given up identifying Noah's flood with the diluvium-producing deluge as well). The remainder was devoted to a comparison of the diluvial deluge with Noah's flood, to see if they were one and the same. The two floods seemed to compare in being comparatively recent, in covering a great extent of the earth if not all of it. Hitchcock cautiously suggested that the indications of the Bible that Noah's flood covered the whole world were referring to the world then known (the ancient Mideast). He compared the Bible's language here to quotes which indicated that the whole world came to Joseph in Egypt to buy grain, or that all the world wanted to hear Solomon's wisdom.

The objections to equating the two floods were principally that diluvial phenomena contained many extinct (≈pre-Adamic) animals; that no human remains had been found in diluvium; and that diluvial phenomena, especially the carving of valleys, were of too great an extent to have been produced by the short Noachic flood. He

---

[321] Ibid., *Biblical Repository and Quarterly Observer* 10, no. 28 (Oct. 1837): 364.

[322] Ibid., 374.

concluded by raising the objections to Noah's flood such as the question of all the animals having room in the ark, the presence of the olive tree/leaf on Ararat, and the ability of all the world's water to cover the land. He remarked that regarding the flood as non-universal resolved most of the objections. Supposing the earth's climate to have been warmer in antediluvian times or the present Mt. Ararat not to be the biblical Ararat solved the olive tree problem. Hitchcock's usual triumphant conclusion was actually somewhat muted here, an indicator of the seriousness with which he regarded scientific evidence:

> …[E]very reasonable man will allow that the Mosaic account of the deluge stands forth fairly and fully vindicated from all collision with the facts of science. We are aware that some will be disappointed if we do not go further, and say that geology strikingly confirms the Mosaic history, as it has been customary to do in most of our popular treatises on the deluge. But we prefer to take our stand upon firm ground. […] Nor is this of much importance, so far as revelation is concerned…If we can only show, that there is no collision between the facts of revelation and those of science, we have done all that is necessary to be done. If any remain skeptical after this is done, the cause of their infidelity does not lie in any scientific difficulties, nor in the want of independent evidence to the truth of the holy Scriptures. It is the fruit of a corrupt and unhumbled heart.[323]

Hitchcock could never abandon either religion or rationality. He was fully prepared to radically change his views of the meaning of the Bible, but never of its truth. Similarly, he would never abandon his geological research, claiming that it only strengthened his faith and exalted his conceptions of God.

Hitchcock did not publish many works on science and religion between 1838 and 1848. He was finishing up his *Final Report on the Geology of Massachusetts*, was increasingly interested in researching fossil footprints, and acquired many more responsibilities when assuming the presidency of Amherst in 1845. In the *Final Report*, he first alluded to having read the works of Louis Agassiz, and first considered a fully

[323] Ibid., *American Biblical Repository* 11, no. 29 (January 1838): 27.

glacial origin for diluvium (which was now being renamed *drift* by geologists to avoid Noachic implications). He also fully separated Noah's flood from the deposition of the diluvium/drift and argued more conclusively for a local flood.[324]

Hitchcock continued to give short speeches to Amherst students and other audiences on science and religion throughout the 1840s. These were mainly more devotional and Christological in nature than scholarly and exegetical. Some brief examples are as follows: *Mineralogical Illustrations of Character* and *The Attractions of Heaven and Earth* (undated; collected in *Religious Truth, Illustrated by Science*) use science as an allegory. The first traced different sorts of moral characters through the examples of different mineral crystals that Hitchcock displayed. For instance, a transparent crystal was an analogy for a guileless Christian character, chatoyant for a brilliant intellectual, perhaps not as pure as the first example, and an opaque crystal was an analogy for a sinful and selfish nature. The second sermon compared differing propensities for being attracted to God versus worldly desires through the medium of comparing the propensities to different types and angles of planetary orbits. Finally, a series of lectures entitled *Religious Essays on Peculiar Phenomena in the Four Seasons* (1851) showed Hitchcock's attempts to draw parallels between, say spring and the Resurrection of Jesus, or autumn and the proper, gentle, anticipatory way for a Christian to confront approaching death. In all of these, Hitchcock was trying to tie in natural phenomena to the truths of Christianity as he saw them.

Hitchcock's 1851 511-page magnum opus, *The Religion of Geology and its Connected Sciences*, was in some respects nothing new. "Most of the following lectures

[324] See Hitchcock, *Final Report on the Geology of Massachusetts*, Postscript 3a-11a, 403-406.

were written as much as eight or ten years ago, though additions and alterations have been made, from time to time, to adapt them to the progress of science."[325] Hitchcock addressed such typical issues as the true interpretation of Genesis 1 and the comparison of Noah's flood with geological deluges. In addition, he included lectures on geological proofs of divine benevolence, consisting of some of his old arguments about the provision of coal for the future human race and volcanoes as global safety valves. The lectures on divine benevolence included some of Hitchcock's most decided romantic rhetoric, as he led the reader on a geological tour of the planet, starting from Massachusetts and going as far afield as Kilauea. He also included lectures on the future condition of the earth, with the scientific justification of the Final Conflagration and the restitution of a new sinless earth where the righteous would live, and in some cases, study the "geology of heaven" (!)

In *Religion of Geology*, Hitchcock outlined the difference between the objectives of science and revelation. According to him, science's aim was "by an induction from facts, to discover the laws by which the material universe is governed. These laws do, indeed, lead the mind almost necessarily to their divine Author. But this is rather the incidental than the direct result of scientific investigations, and belongs rather to natural theology than to natural science."[326] In contrast, revelation's objective is to pass on moral truths, and speaks in a popular fashion. Thus, the "earth" spoken of in the Bible might only be the region of the Middle East known to the ancient Hebrews. Hitchcock derived from these contrasts the conclusion that "since science and revelation treat of the same

[325] Hitchcock, *Religion of Geology*, v.

[326] Ibid., 2-3.

subjects only incidentally, we ought only to expect that the facts of science, rightly understood, should not contradict the statements of revelation, correctly interpreted. Apparent discrepancies there may be…because science has not fully and accurately disclosed the facts, or the Bible is not correctly interpreted; but if both records are from God, there can be no real contradiction between them. But, on the other hand, we have no reason to expect any remarkable coincidences, because the general subject and object of the two records are so unlike. Should such coincidences occur, however, they will render it less probable that any apparent disagreement is real."[327]

Hitchcock continued to defend gap theory as the most probable reconciliation of Genesis and geology, while admitting Day/age theory as possibly legitimate[328]. He also addressed the problem of death and carnivorous animals being present in the fossil record prior to Adam's sin. He argued that death and meat-eating actually on the whole increased benevolence in the natural world by insuring quick death for plant-eaters and keeping populations in balance. Hitchcock said that scholars were unduly influenced by Milton's depiction of nature suddenly becoming harsh and animals turning carnivorous after the sin, rather than following the plain text of the Bible.

---

[327] Ibid., 4-5.

[328] Hitchcock continued to regard geological time in generally qualitative, not quantitative terms. However, in discussing gap theory, he noted that "if the sacred writer would pass over [a gap] of ten years in silence, he could, with the same propriety, pass over ten millions. Now, the longer I study geology, the nearer do my ideas approximate to the latter number as a measure of the earth's duration." Ibid., 457. Also see Hitchcock's moralistic satire, *Account of a Zoological Temperance Convention, Held in Central Africa in 1847* (Boston: Nathaniel Noyes, 1855), 15, where he noted that the animals convened "in the year 570,870 of the [animal] kingdom, corresponding to the year 5847 of man's creation." Both of these estimates were not in any way scientifically precise calculations, though.

One feature new to *Religion of Geology* was an extended attack on "creation by law," or evolution, prompted by the anonymous publication of *Vestiges of the Natural History of Creation* (1844) defending evolution. Hitchcock admitted that even if "creation by law" was accepted, God was still necessary to cause the origin of life. "For if we admit that every thing in the world of matter and mind, not excepting miracles and special providences, is regulated, if not produced, by law, it does not take away the necessity of a contriving, sustaining, and energizing Deity."[329] That said, it would still have a disastrous moral effect by rendering a conception of God more deistic than Biblical and intervening. Hitchcock also contemptuously dismissed German and Swiss idealist philosophers who advocated some sort of evolution, such as Lorenz Oken, as unintelligible and well nigh insane. The most important factor, though, was the question of whether evolution was true. This Hitchcock opposed through a denial of vitalism. Vitalism was the idea that life's properties were inherent in nature, and that organisms could spontaneously appear through acts of self-organization. He cited evidence against electrical experiments that seemed to have created worms from nonliving matter. Hitchcock also used fossil evidence that complex organisms are found early in geological time to demolish evolution as held by pre-Darwinian thinkers, as they insisted life must necessarily progress in complexity over time.

Hitchcock concluded by claiming objectivity in his critique. "I have endeavored to treat the subject in a candid and philosophical manner, not charging atheism upon its advocates when they declare themselves Theists and Christians. Neither have I called in the aid of ridicule, as might easily be done, and as, in fact, has been done by almost every

[329] Ibid., 295.

opponent of the system who has written upon it. I have endeavored to show that the hypothesis, tried in the balances of sound philosophy, is found wanting…"[330] Hitchcock had indeed sharply ridiculed the idealist philosophy of those who also advocated evolution, but he refrained from such merely mocking attacks on evolution itself. Hitchcock always firmly believed that he rejected evolutionary theory merely on the basis of the facts, although the moral consequences of its adoption would be dire. It is difficult to determine how true this depiction is; but he certainly seems to have believed it.

In *Religion of Geology*, Hitchcock also unveiled his theory of the "Telegraphic System of the Universe," using a style more like his moralistic essays such as "Mineralogical Illustrations of Character" than his scientific articles. He attempted to show that human actions and thoughts created an indelible impression on the universe by appealing to the laws of physics and modern theories of vibration. For instance, he derived the following conclusion from the relatively new idea of the propagation of sound waves. "Not a word has ever escaped from mortal lips…but it is registered indelibly upon the atmosphere we breathe. And could man command the mathematics of superior minds, every particle of air thus set in motion could be traced…with as much precision as the astronomer can point out the path of the heavenly bodies…To follow it requires, indeed, a power of analysis superior to human; but we can conceive it to be far inferior to the divine."[331] He also posited that beings with super-sensitive vision on other

[330] Ibid., 322-323.

[331] Ibid., 412.

planets (say, the equivalent of 6000 light years away) would be able to see Adam's creation as if it were occurring now.[332]

Hitchcock proposed that human senses, in a sinless resurrected body, might be able to see all of creation and study all forms of extraterrestrial life. Hitchcock blended ideas that seem to have emerged out of proto-science fiction with the most orthodox Protestantism. This is a remarkable blend of piety and extravagant visionary thought, probably unusual even in Hitchcock's era. Hitchcock's exalted hypothesizing reached a climax in his tracing, in *Religion of Geology*, of a grand seven-stage scheme of human history. Hitchcock's historical outline described the progress of humans in receiving and discovering increasingly accurate knowledge of God's characteristics and plans. The very idea that humans now possessed accurate views of God seems at first glance breathtakingly arrogant, but it was a natural consequence of Protestant Baconianism, in which facts in theology were as objectively incontrovertible as those in science supposedly were. The first step in Hitchcock's scheme was primitive animism, where people conceived of some sort of supernatural beings superior to them. The second was ancient polytheism, with ideas of supreme gods and some sort of soul. The third was Old Testament monotheism. Even though some Greek philosophers' conception of God might have been more sophisticated, to Hitchcock, than some of the ideas of the Jews, the moral attributes of God were displayed in the Old Testament more truly than in any other ancient writing. The New Testament gave mankind the best possible grasp of God's moral attributes. The final three steps all consisted of the discoveries of modern science:

---

[332] This conception *may* have followed from contemporary attempts to determine the speed of light and thus the time starlight would take to reach earth, as calculated by astronomers such as William Herschel.

Copernicus and Galileo's discoveries, showing how vast God's universe was; microscopy, which showed how God's creative wonders extended even to infinitesimal dimensions; and finally ***geology***, Hitchcock's beloved specialty, which opened new vistas of incalculable time. The effect of all these stages was to increase man's conception and love for God.

Hitchcock's "sacred historiography" constituted a resolution to the dilemma with which he had struggled in his early letters to Silliman. If geology not only demonstrated the existence of God, but its discoveries were part of God's vast plans for humanity, it was truly a divine science. Geology was not a threat to faith, but a means for Hitchcock to sanctify himself to God.

Hitchcock concluded *Religion of Geology* with an ecstatic picture of the post-Final Conflagration, sinless earth, which would still be material, and in which the righteous would be investigating its geology. "But when the Christian philosopher shall be permitted to resume the study of science in a future world, with powers of investigation enlarged and clarified, and all obstacles removed, he will be able to trace onward the various ramifications of truth, till they unite into higher and higher principles, and become one in that centre of all centres, the Divine Mind. That is the Ocean from which all truth originally sprung, and to which it ultimately returns. To trace out the shores of that shoreless Sea, to measure its measureless extent, and to fathom its unfathomable depths, will be the noble and the joyous work of eternal ages. And yet eternal ages may pass by and see the work only begun."[333] I cannot think of a better summation of Hitchcock's ideas of religion, rationality, and romanticism. The ideas

[333] Ibid., 511.

appear quite excessive to moderns, and possibly even to some of Hitchcock's contemporaries. What makes Hitchcock unusual is that these phantasmagoric conceptions were harmonious in his mind with traditional Calvinism and sober scientific studies.

General Thoughts, Response to Critics and to Darwin (1852-1863)

"I have written and published too much, both for reputation and for usefulness…It is well calculated to humble pride and self-sufficiency to realize how few, if any, of these productions will survive the present generation. If any of them do, it will be owing to their connection with Christianity."[334]

Hitchcock's dream had long been to author a comprehensive work on natural theology in all aspects of science. He never accomplished that, but did collect many of his journal articles and addresses on the subject from the 1850s in his 1857 anthology *Religious Truth, Illustrated by Science*. One particularly important essay, from 1852, was "The Relations and Mutual Duties between the Philosopher and the Theologian," given to Andover Theological Seminary. (Incidentally, during this speech, Hitchcock mourned the recent death of Moses Stuart, whom he praised as the "Nestor of biblical philology.").[335]

This essay is probably the most detailed summary of Hitchcock's mature religious thought. Hitchcock claimed that theology deserved more epistemological authority than any branch of knowledge that did not involve absolute proofs, such as mathematics. The Bible was absolutely and inviolably *true*, but the interpretations of its truths, when they touched on nature, could be altered by scientific investigation. Hitchcock also argued that theology was superior to any other type of knowledge in regulating morality and human conduct. He strongly urged that "to the scientific man should be granted the freest and the

---

[334] Hitchcock, *Reminiscenses*, 391-392.

[335] Hitchcock, "Mutual Relations," in *Religious Truth, Illustrated by Science*, 56.

fullest liberty of investigation."[336] He also insisted that those attempting to reconcile science and religion should have a good background in both fields, an implicit critique of opponents such as Stuart and Granville Penn. Hitchcock fervently asserted that science was favorable to the inculcation of piety in an objective and unprejudiced mind,

Scientific progress uncoupled with religious piety was highly dangerous, as evidenced by the scientific brilliance of the anti-religious savants in France, who contributed to fomenting the French Revolution. Hitchcock lamented the polemical tone that was sometimes used by theologians to denounce scientists, and vice versa. He was certain that "[t]he more threatening to religion the developments of any science at first, the more abundant will be its defence and illustration of religion ultimately. Finally, it is unwise hastily to denounce any new discovery as unfriendly to religion, and much safer to wait until its nature and bearing are well understood."[337] Hitchcock can be seen here as defending his chosen vocation, geology, from charges of heresy and impiety, which he was soon to receive.

During the 1850s, Hitchcock suffered some violent attacks in the press and correspondence against *The Religion of Geology*, both from skeptics and literalists. One particularly insulting series of articles came from the pseudonymous "Vindex," writing in the skeptical organ *The Boston Investigator*. "Vindex" accused Hitchcock and other clergymen of oppressing the general community with priestcraft, and said that science and religion, Genesis and geology, were totally irreconcilable. He accused Hitchcock of

---

[336] Ibid., 93.

[337] Ibid., 94.

duplicity worthy of Talleyrand. Clergymen also wrote letters to him saying that his work disrespected God and that he must watch out for his soul.

In response to his critics, Hitchcock summed up his current views on science and religion in an additional chapter appended to the revised 1859 edition of *The Religion of Geology*. In hisnew preface, he claimed that he was delighted by the opposition of infidels such as "Vindex" but grieved by the opposition of Christians. He concluded that "The Infidel raves furiously because I have endeavoured to make geology sustain and illustrate religion; but my Christian friend declares my book to be thoroughly *Infidel*. One of the parties must surely be mistaken…Till they can settle that question, I think I may rest quietly. Like an acid and an alkali in chemistry, the two attacks neutralise each other, and leave me unharmed."[338]

In Hitchcock's new chapter in *Religion of Geology*, he maintained some support for gap theory, but regarded the creation days increasingly as being in some sense symbolic. "The days are symbolical…The six pictures on the Mosaic tablet were intended to embrace the universe, having existing nature on the foreground, as it meets the eye of the common observer… In the times of Moses, language must have been very general and indefinite, and the views for which we contend require only that, in speaking of the different classes of objects created, he should give merely the common unscientific ideas which then prevailed concerning them. It is a great relief thus to be able to extricate the sacred writer from the trammels of modern systems."[339]

---

[338] *Religion of Geology*, 2nd ed., xii, italics Hitchcock's.

[339] Ibid. 331-332.

Hitchcock also reaffirmed the idea of a limited Noachic flood and a total Final Conflagration in the new chapter. He also concluded that the finite mineral resources available also indicated that humans must ultimately perish from lack of fuel. However, he came out strongly against predictors of imminent apocalypse, given the great amount of remaining coal and other minerals. "[H]ow strong the presumption [from resource abundance] that man is now in the earlier part of his terrestrial existence, and not, as some gloomy prophets would persuade us, just on the eve of those mighty transformations, which according to Scripture, the earth must pass through." [340]

Hitchcock derived three overall conclusions about nature in the light of religion in the new chapter. First, the existence of a law of Unity-all nature showed marks of one Designer. The constancy of the laws and ecological niches found in nature, from physics and chemistry to the presence of both carnivorous and herbivorous animals in all fossil-bearing strata, provided "conclusive evidence that the past as well as the present are the product of one all-directing, all-wise, infinite mind…The thought seems to link us to the great universe in fraternal bonds, and by a filial relation to its infinitely greater Author."[341] Secondly, God was subjecting nature to progressive enhancement-a Law of Change transcending even the constancy of natural law. This was evident through the change in matter conducted through chemical reactions, the increasing complexity of life seen in the fossil record, and the existence of death and decay. Finally, a proper view of nature should reveal to one the Vastness of the Divine Plans, which he summarized as endless progress, throughout the universe and even in the afterlife. As usual, he said that

---

[340] Ibid., 337.

[341] Ibid., 348.

these conclusions were nowhere more evident than in geology. These conclusions should exalt the Christian's view of God and cause infidels to believe in the Bible.

Hitchcock's final views of science and religion can be found in his last two articles for *Bibliotheca Sacra*, a journal that had absorbed the previous periodicals in which he published his major science-religion articles. The first of these two articles, "The Cross in Nature and Nature in the Cross," from 1861, tried to show how revealed religion and Christological indicators were present in nature just as much as evidence of the existence of God (natural religion). The thrust of Hitchcock's argument here was that the condition of the world and human life provided evidence for Christ's mediatorial sacrifice. This argument harked back to Hitchcock's early Conway sermons. The planet in its current state was not adapted to the needs of perfect and sinless beings, given the existence of uninhabitable land, extreme climates, and disease. Violation of the laws of nature and society almost always resulted in retribution. However, the world was not in a state of retribution, like Hell, given the positive and delightful aspects of life. The conclusion Hitchcock drew was that "this world is wisely adapted to a fallen being, for whom there may be recovering mercy in store, and who needs moral discipline."[342] Thus, a human who had not been taught the Bible would be prepared, through an examination of nature, to receive the Gospel when it was brought to him. This can be seen as an attempt by Hitchcock to remove the evangelical objections to natural theology in that it only brought one to acknowledge the existence of God, and not of any Christian truth.

In contrast to some theologians, Hitchcock claimed that death and suffering had been in the world since prehistoric times among animals, and were not introduced after

[342] Hitchcock, "The Cross in Nature and Nature in the Cross," *Bibliotheca Sacra and Biblical Repository* 18, no. 70 (April 1861): 258.

Adam's sin. They were part of God's plan for Christian salvation, prepared in prehistory. Geological evidence of death and carnivorous animals thus fully exhibited, rather than denied, God's great benevolence. Reinforcing Hitchcock's perception of geology as a divine science, he concluded that "*a full and complete history of redemption includes pre-Adamic history*."[343] He concluded the essay with another look toward the redemption of the entire creation in a sinless post-Conflagration world. "Then, too, will the redeemed take up the retrospect of the world's history…what event in the scientific, the political, the social, or the military annals of the globe, will not be found to have been connected with the progress of redemption? The earliest record, which the geologist finds registered in the earth's foundations, nay even the act of creation itself, will be seen to point significantly to the cross."[344]

Hitchcock's last theological essay, "The Law of Nature's Constancy Subordinate to the Higher Law of Change," was an attempt to understand how God's plans relate to the fixed status of the laws of nature. The essay is an expansion of Hitchcock's conclusions from his 1859 addition to *Religion of Geology*. He surveyed the branches of law governing the universe, which he divided into five types and described. The types of law were: mechanical, chemical, organic, intellectual, and miraculous. Hitchcock showed here his tendency to systematize and rationalize nature and miracles, including them as similar parts of God's overall plan for the universe. Mechanical law was essentially Newtonian mechanics, and demonstrated the most constancy. Hitchcock noted that even physical laws might eventually run down and require Divine intervention to restore the universe. Chemical law included electromagnetic and heat-based phenomena. The

[343] Ibid., 280.

[344] Ibid., 283.

presence of chemical reactions and the existence of metamorphic rock showed that "change is not only the higher law, but it is only by reasoning that we satisfy ourselves that there is constancy in the change."[345]

Hitchcock then turned to organic law. This section is particularly significant in that it contains Hitchcock's only response to Darwinian evolution per se. Hitchcock saw even more change evident here than in chemical law, in the form of birth, growth, and death. In particular, change was clearly shown through an examination of the fossil record, and God's successive destruction and recreation of new forms of life. Hitchcock diverged from the main topic to vigorously assert that organic law did *not* imply that life had evolved from common ancestors. Hitchcock's response to evolution in "The Law of Nature's Constancy" is not significantly different than his response to *Vestiges of the Natural History of Creation* in *Religion of Geology*, except that Hitchcock did give more emphasis here to the gaps in the fossil record in his attack on evolution. Indeed, Hitchcock still regarded *Vestiges* as the best contemporary work describing evolution overall, especially "zöogony," the origin of life from nonliving matter. He conceded that evolutionary "zöonomy [the mechanism of evolutionary development] has been more extensively and ably illustrated [than in *Vestiges*] by Mr. Darwin, in his work on the Origin of Species."[346]

Once again, Hitchcock listed the dire moral consequences of subscribing to evolution, yet insisted that his objections were solely based on scientific considerations. If evolution were true, it would have to be accepted, and would not in itself constitute atheism. Hitchcock was confident that special creation was true, He said that before

---

[345] Hitchcock, "The Law of Nature's Constancy," 503.

[346] Ibid., 521.

evolutionists and materialists were able to deny the intervening hand of God in nature, they would have to prove the fossil record false. For Hitchcock, paleontological studies were the surest scientific indicator of God's supervision, through their demonstration of His introduction of successively higher forms of life, all perfectly adapted to their environments. Thus, paleontology was a potent anti-evolutionary weapon in Hitchcock's worldview.

Hitchcock gave relatively short shrift to intellectual laws, as the laws that governed human thought had not yet been discovered, yet God surely knew them. Hitchcock also addressed miraculous law briefly, because of similar human ignorance. Instead, he tried to illustrate how God governed the world, even in a non-miraculous way, using analogies. He referenced the concept of God knowing the position and velocity of all particles in the universe, and therefore forecasting every event therein (a sort of Laplacian determinism). He also compared life to a great sea, which he described in terms redolent of a nautical *Pilgrim's Progress* ("indolence lagoon," "Bible lighthouse," "ice floe of skepticism," and "hope harbor.")[347] This sudden turn from an exploration of science to moralistic analogies is common in Hitchcock's writings. The prevalence of such turns is part of what makes Hitchcock unusual even in his time.

Hitchcock's conclusions to this final article were typical. First, God's benevolence was shown through His balancing incessant change with constant natural law to enable organisms to live tranquilly most of the time. Second, God had intervened miraculously to progressively create new forms of life over geological time. Third, through the use of this higher law of progressive change, God could act in nature without

---

[347] Ibid., 541-542.

even the use of miracles. Finally, Hitchcock extended the idea of change to the afterlife and claimed that God would continue improving the universe forever. "Will God, then introduce everlasting monotony and permit no changes in heaven? Rather would analogy lead us to conclude that it may be a succession of higher and higher economies of life and enjoyment, into which the law of change shall introduce us. [Rather than providing the righteous with earthly objects of delight, He would produce] objects far more attractive and glorious…such as infinite benevolence will delight to scatter in rich profusion all along the upward pathway of our immortal existence."[348] Hitchcock's scientific yet wild view of the afterlife was consistent to the end of his life. In all of these final works, his commitment to religion, rationality, and romanticism remained as strong as ever, and all inseparable.

In conclusion, what makes Hitchcock such a unique and important object of study? I would say that it is the confluence of the three main components of his worldview, and the passion with which he strove to show their consistency with each other. In addition, I would point out the extent to which his ideas became increasingly extravagant and even phantasmagorical in the last two decades of his life. Certainly, there were many devout preachers in Hitchcock's America, and a fair number of accomplished scientists. Most scientists even subscribed to ideas of an ultimate fusion of science and religion in the Baconian framework described by Bozeman and others. Few scientists *or* clergymen, however, combined such passionate romanticism and science-fictional speculation with their preaching and research.

---

[348] Ibid., 561.

Hitchcock should not be regarded as an absolutely unique figure in his combination of religion and science with romanticism. As Astore pointed out in the case of Thomas Dick, this combination was not unknown in Hitchcock's era. However, Hitchcock's sheer intensity of conviction that he brought to these concepts in *public sermons and scholarly theological articles*, combined with the copious number of times he repeated these motifs, can be considered exceptional. His imaginings became increasingly wild late in his career, yet this did not seem to adversely affect the scholarly quality of his work on the 1861 Vermont geological survey. Similarly, Hitchcock's ichnological work continues to be praised (though his classificatory schemes were somewhat confusing) and is a live topic for paleontological research to this day. Hitchcock was both a synthesizer and a compartmentalizer when it came to the relations of science and religion. He adamantly opposed the ideas of earlier cosmogonists and contemporary literalists, who attempted to show that all the principles of modern science were to be found in the Bible. Therefore, he placed a clear line of demarcation between *Biblical* truth and scientific truth, at least in the sense that the Bible ought to be described as using nonscientific language to describe nature. This allowed Hitchcock to greatly modify his opinions about the true interpretation of Creation and the Flood. Hitchcock ultimately thought that scientific truths *were* religious truths, and would give humans an increasingly exalted conception of God, both in this life and the next, if they were properly used.

BIBLIOGRAPHY

A. Manuscripts from the Edward and Orra White Hitchcock Papers, Archives and Special Collections, Amherst College, Massachusetts. All manuscripts were authored by Edward Hitchcock.

"An introductory address, delivered before the 'Society of Literary Adelphi,' at their seventh anniversary, Aug 8th 1811," Commonplace book no. 1 (Box 18, Folder 3).

"Coincidence Between Natural Theology and Christianity in Regard to the Fallen State of Man." Sermon no. 139 on Romans 1:18-20, December 1822 (Box 7, Folder 8).

"Comparison Between the Knowledge Derived from the Scriptures & Human Literature & Science." Sermon no. 243 on Jeremiah 23:28, May 1824 (Box 8, Folder 12).

"Election." Sermon no. 125 on Isaiah 58: 1-2, September 1822 (Box 7, Folder 7).

"Essays on the Mosaic Chronology of the World Compared with the ancient monuments of Arts and Science and History And with the present appearances of the earth. I. [Mosaic Chronology compared] with the ancient monuments of Art and Science, including ancient history & tradition", ca. 1820, (Box 21, Folder 9).

"Essays on the Mosaic Chronology of the World Compared with the ancient monuments of Arts and Science and History And with the present appearances of the earth. II. Proofs of the Mosaic account of the deluge from an examination of the internal structure of the earth," ca. 1820, (Box 21, Folder 9).

"Geology of the Bible," ca. 1828, (Box 21, Folder 7).

Hitchcock's draft reply to an unidentified reviewer of *The Religion of Geology*, 15 June 1857, (Box 13, Folder 28).

"Morality Not Inconsistent With Entire Depravity." Sermon no. 105 on Psalms 58: 1-2, April 1822 (Box 7, Folder 3).

"Memorandum" on Hitchcock's "conversion to Christ and the Orthodox faith," ca. 1820-1830, (Box 19, Folder 1).

"Noachian Deluge." Sermon no. 128 on II Peter 2:5, January 1823 (Box 7, Folder 7).

"On the present state of liberty" (written in 1809 or 1810, copies made in 1811), Commonplace book no. 1 (Box 18, Folder 3).

B. Primary Sources (Hitchcock's published work and contemporary authors)

Blunt, Edmund M. "Original Communications." *American Monthly Magazine* 2, no. 3 (January 1818): 169-70.

_____. "Original Communications." *American Monthly Magazine* 3, no. 4 (August 1818): 296.

Buckland, William. *Reliquiae Diluvianae; or, Observations on the Organic Remains Contained in Caves, Fissures, and Diluvial Gravel, and on other Geological Phenomena, Attesting the Action of a Universal Deluge*. London: J. Murray, 1823; reprint, New York: Arno Press, 1978.

Deane, James, Gideon Mantell, Richard Owen, and Benjamin Silliman. "Ornithichnites of the Connecticut River Sandstones and the *Dinornis* of New Zealand." *American Journal of Science* 45, no. 1 (April-June, 1843): 177-188.

Fisher, George P. *Life of Benjamin Silliman, M.D., LL.D., Late Professor of Chemistry, Mineralogy, and Geology in Yale College. Chiefly from his Manuscript Reminiscences, Diaries, and Correspondence*, 2 vol. New York: Charles Scribner and Company, 1866.

Hitchcock, Edward. *Account of a Zoological Temperance Convention, Held in Central Africa in 1847*. Boston: Nathaniel Noyes, 1855.

_____. *Address on Retiring from the Presidency*. Publisher unknown, [1854?]

_____. "Case of Optical Illusion in Sickness, with an Attempt to Explain its Psychology." *New Englander* 3, Iss. 10 (April, 1845): 192-215.

_____. "The Connection Between Geology and Natural Religion." *Biblical Repository and Quarterly Observer* 5, no. 17 (Jan. 1835): 113-138.

_____. "The Connection Between Geology and the Mosaic History of the

Creation." *Biblical Repository and Quarterly Observer* 5, no. 18 (April 1835): 439-451; 6, no 20 (October 1835): 261-332.

_____. "The Cross in Nature and Nature in the Cross." *Bibliotheca Sacra and Biblical Repository* 18, no. 70 (April 1861): 253-284.

_____. *An Essay on Temperance, Addressed Particularly to Students and the Young Men of America*, 2d ed. Amherst: J. S. and C. Adams, 1830.

_____. "First Anniversary Address before the Association of American Geologists." *American Journal of Science* 41, no. 2 (July Sept. 1841): 232-275.

_____. *Final Report on the Geology of Massachusetts* Amherst: J.S. & C. Adams, 1841.

_____. *The Highest Use of Learning*. Amherst: J.S. & C. Adams, 1845.

_____. "The Historical and Geological Deluges Compared." *Biblical Repository and Quarterly Observer* 9, no. 25 (January 1837): 78-139; 10, no. 28 (October 1837): 328-374; [Journal name changed to *American Biblical Repository*] 11, no. 29 (January 1838): 1-27.

_____.*Ichnology of New England. .A Report on the Sandstone of the Connecticut Valley, especially its Fossil Footmarks*. Boston: William White, 1858. Reprint, New York: Arno Press, 1974.

_____. *Illustrations of Surface Geology*. Smithsonian Contributions to Knowledge, vol. IX. Washington, D.C.: Smithsonian Institution, 1857.

_____. "Influence of Nervous Disorders upon Religious Experience." *Christian Spectator* 9 (N.S. 1), no. 4 (April 1827): 177-205.

_____. *The Inseparable Trio.* Boston: Dutton and Wentworth, State Printers, 1850.

_____. "The Law of Nature's Constancy Subordinate to the Higher Law of Change." *Bibliotheca Sacra and Biblical Repository* 20, no.79 (July 1863): 489-561.

_____. "Mineralogical Illustrations of Character," in *Religious Truth, Illustrated from Science, in Addresses and Sermons On Special Occasions,* 285-302. Boston: Phillips, Sampson and Co., 1857.

_____. "Mutual Relations Between the Philosopher and Theologian," 1852, reprinted in *Religious Truth, Illustrated from Science*, 54-97.

_____. "Notes on the Geology of several parts of Western Asia; founded chiefly on Specimens and Descriptions from American Missionaries." In *Reports of the First, Second, and Third Meetings of the Association of American Geologists and Naturalists, at Philadelphia, in 1840 and 1841, and at Boston in 1842, Embracing its Proceedings and Transactions,* by the Association, 348-421. Boston: Gould, Kendall, & Lincoln, 1843; reprint, New York: Arno Press, 1978.

_____. "Notice and Review of the *Reliquianae Diluvianae*." *American Journal of Science* 8, no. 1 (January 1824): 150-168; . 8, no. 2 (January 1824): 317-338.

_____. "Original Communications." *The American Monthly Magazine and Critical Review* 2, no. 2 (December 1817): 89-90.

_____."Original Communications," *American Monthly Magazine* 3, no. 3 (July 1818): 211.

_____. "Ornithichnology—Description of the Foot marks of Birds, (Ornithichnites) on new Red Sandstone in Massachusetts." *American Journal of Science* 29, no. 2 (January 1836): 307-340.

_____. "Ornithichnology defended." *Knickerbocker* 8, no. 3 (September 1836): 289-295.

_____. "The Phenomena of Drift, or Glacio-aqueous action in North America, between the tertiary and alluvial Periods." In *Reports of the Association of American Geologists and Naturalists,* 164-221. Boston: Gould, Kendall, & Lincoln, 1843; reprint, New York: Arno Press, 1978.

_____. *The Religion of Geology and its Connected Sciences*. Boston: Phillips, Sampson, and Company, 1852. Reprint, Hicksville: Regina Press, 1975.

_____.*The Religion of Geology and its Connected Sciences…With an Additional Lecture, Giving a Summary of the Author's Present Views of the Whole Subject*, 2nd ed. London: James Blackwood & Co., 1859.

_____. "The Religious Bearings of Man's Creation." In *Religious Truth, Illustrated from Science, in Addresses and Sermons on Special Occasions*. Boston: Phillips, Sampson, and Company, 1857.

_____. "Remarks on Professor Stuart's Examination of Gen. I. in Reference

to Geology," *Biblical Repository and Quarterly Review* 7, no. 22 (April 1836): 448-487.

_____."Remarks on the Geology and Mineralogy of a Section of Massachusetts on Connecticut River, with a Part of New-Hampshire and Vermont," in *The American Journal of Science* 1, no. 2 (1819): 105-16.

_____. *Reminiscences of Amherst College, Historical, Scientific, Biographical and Autobiographical: Also, of Other and Wider Life Experiences*. Northampton, Mass.: Bridgman & Childs, 1863.

_____. "Report on Ichnolithology, or Fossil Footmarks, with a Description of several New Species, and the Coprolites of Birds, from the valley of Connecticut River, and of a supposed Footmark from the valley of Hudson River." *American Journal of Science* 47, no. 2 (July-Sept. 1844): 292-322.

_____. "Review of Buckland's *Reliquiae Diluvianae*." *Christian Spectator* 6, no. 8 (August 1824): 415-436.

_____. "A Sketch of the Geology, Mineralogy, and Scenery of the Regions contiguous to the River Connecticut; with a Geological Map and Drawings of Organic Remains; and occasional Botanical Notices…Part I." *American Journal of Science* 6, no. 1 (1823): 1-86.

_____. "Geology of the Connecticut…Part III. Scenery." *American Journal of Science* 7, no. 1 (1824): 1-16.

_____. "Geology of the Connecticut…Part IV. Miscellanies." *American Journal of Science* 7, no. 1 (1824): 16-30.

_____. *Supplement to the Ichnology of New England*. Boston: Wright and Potter, 1865.

_____. *Utility of Natural History*. Pittsfield, MA: Phinehas Allen, 1823.

_____. *A Wreath for the Tomb: or, Extracts from Eminent Writers on Death and Eternity with an Introductory Essay and Sermon on Lessons Taught by Sickness* [book on-line]. Amherst: J.S. And C. Adams, 1839. Accessed 8 October 2002. Available from Library of Congress, American Memory, Sunday School Books: Shaping the Values of Youth in Nineteenth Century America. http://memory.loc.gov/cgibin/query/r?ammem/svy:@field(DOCID+@lit(wrea6))

"Obituary: Edward Hitchcock." *American Journal of Science* 2nd series 37, no. 110 (March 1864): 302-304.

"Ornithichnology." *Knickerbocker* 7, no. 6 (June 1836): 578-582.

"Ornithichnology Reconsidered." *Knickerbocker* 8, no. 4 (October 1836): 456-458.

Review of *Dyspepsia Forestalled and Resisted*, by Edward Hitchcock. *Christian Examiner and General Review* 9 (N.S. 4), no. 2 (Nov., 1830): 236-250.

Stuart, Moses. "Critical Examination of Some Passages in Gen. I.; With Remarks on Difficulties that Attend Some of the Present Modes of Geological Reasoning." *Biblical Repository and Quarterly Observer* 6, no. 21(Jan. 1836): 46-106.

C. Secondary Sources.

Aldrich, Michele. "Hitchcock, Edward." In *Dictionary of Scientific Biography* 6 (1972): 437-438.

Astore, William J. *Observing God: Thomas Dick, Evangelicalism, and Popular Science in Victorian Britain and America*. Burlington, VT: Ashgate, 2001.

Bakker, Robert T. "Dinosaurs Acting Like Birds, and Vice Versa—An Homage to the Reverend Edward Hitchcock, First Director of the Massachusetts Geological Survey." In *Feathered Dragons: Studies on the Transition from Dinosaurs to Birds*, ed. Philip J. Currie, Eva B. Koppelhus, Martin A. Shugar, and Joanna L. Wright, 1-10. Life of the Past, ed. James O. Farlow. Bloomington: Indiana University Press, 2004.

Bozeman, Theodore Dwight. *Protestants in an Age of Science: The Baconian Ideal and Antebellum American Religious Thought*. Chapel Hill: University of North Carolina Press, 1977.

Brooke, John Hedley. "The natural theology of the geologists: some theological strata." In *Images of the Earth: Essays in the History of the Environmental Sciences*, ed. L.J.Jordanova and Roy S. Porter. BSHS Monograph 1. Chalfont St. Giles: British Society for the History of Science, 1979: 39-64.

Chickering, Howell D., Jr. "Edward Hitchcock's Mountain Mania." *The New-England Galaxy* 19, no. 4 (Spring 1978): 3-12.

Colbert, Edwin H. *Men and Dinosaurs: The Search in Field and Laboratory*. New York: E.P. Dutton & Co., Inc., 1968.

Dean, Dennis R. "Hitchcock's Dinosaur Tracks," *American Quarterly* 21, iss. 3 (Autumn 1969): 639-44.

_____. *Gideon Mantell and the Discovery of Dinosaurs*. New York: Cambridge University Press, 1999.

Gilmore, Paul. "The Telegraph in Black and White." *English Literary History* 69, no. 3 (2002): 805-833.

Giltner, John H. "Genesis and Geology: The Stuart-Silliman-Hitchcock Debate," *Journal of Religious Thought* 23, no. 1 (1966-1967): 3-13.

Greene, John C. "Protestantism, Science, and American Enterprise: Benjamin Silliman's Moral Universe." In *Benjamin Silliman and His Circle : Studies on The Influence of Benjamin Silliman on Science in America*, ed. Leonard G. Wilson, 11-27. New York: Science History Publications, 1979.

Guralnick, Stanley M. "Geology and Religion before Darwin: The Case of Edward Hitchcock (1793-1864)." *Isis* 63, no. 219 (December 1972): 529-543.

_____. *Science and the Ante-Bellum American College*. Memoirs of the American Philosophical Society, vol. 109. Philadelphia: American Philosophical Society, 1975.

Haber, Francis C. *The Age of the World: Moses to Darwin*. Baltimore: Johns Hopkins Press, 1959.

Haltunnen, Karen. "Mountain Christenings: Landscape and Memory in Edward Hitchcock's New England." In *New England Celebrates: Spectacle, Commemoration and Festivity: Proceedings of the Dublin Seminar for New England FolklifeJune 23 -25, 2000*, edited by Peter Benes, 166-177. Boston University, 2002.

Hitchcock, Charles Henry. "Edward Hitchcock." *American Geologist* 16, no. 3 (September 1895): 133-149.

Hooykaas, Reijer. *Catastrophism in geology, its scientific character in relation to actualism and uniformitarianism*. Medelingen der Koninkluke Nederlandse Akademie van Wetenschappen, afd. Letterkundem Nieuwe Reeks, Deel 33, No.7. Amsterdam & London: North-Holland Pub. Co., 1970.

Hovenkamp, Herbert. *Science and Religion in America, 1800-1860*. University of

Pennsylvania Press, 1978.

Hull, David L. *Darwin and His Critics: The Reception of Darwin's Theory of Evolution by the Scientific Community*. Cambridge: Harvard University Press, 1973.

Fuess, Claude Moore. *Amherst: The Story of a New England College.* Boston: Little, Brown, and Company, 1935.

Kohlstedt, Sally Gregory. *The Formation of the American Scientific Community: The American Association for the Advancement of Science 1848-60*. Chicago: University of Illinois Press, 1976.

Lawrence, Philip J. "Edward Hitchcock: The Christian Geologist." *Proceedings of the American Philosophical Society* 116, no. 1 (February 15, 1972): 21-34.

Levin, Miriam R. *Defining Women's Scientific Enterprise: Mount Holyoke Faculty and the Rise of American Science*. Hanover and London: University Press of New England, 2005.

Marché, Jordan D., II. "Edward Hitchcock's Poem, *The Sandstone Bird* (1836)." *Earth Sciences History* 10, no. 6 (1991): 5-8.

_____. "Edward Hitchcock, *Fucoides*, and the Ichnogenus *Scoyenia*." *ESH* 11, no. 1 (1992): 13-20.

_____. "Edward Hitchcock's Promising Astronomical Career." *ESH* 12, no. 2 (1993): 180-186.

_____. "Restoring a 'Public Standard' to Accuracy: Authority, Social Class, and Utility in the American Almanac Controversy, 1814-1818." *Journal of the Early Republic* 18, no., 4 (Winter 1998): 693-710.

McCormack, Jerusha Hull. "Domesticating Delphi: Emily Dickinson and the Electro-Magnetic Telegraph." *American Quarterly* 55, no. 4 (2003): 569-601.

Merrill, George P. *The First One Hundred Years of American Geology*. New Haven: Yale University Press, 1924. Reprint, New York: Hafner Publishing Company, Inc, 1964.

Millhauser, Milton. "The Scriptural Geologists: An Episode in the History of Opinions." *Osiris* 11 (1954): 65-86.

Morton, Glenn R. "Why I left Young-earth Creationism." Accessed 28 November 2005; Available from http://home.entouch.net/dmd/gstory.htm.

Nadon, G.C. "The Impact of Sedimentology on Vertebrate Track Studies." In *Mesozoic Vertebrate Life: New Research Inspired by the Paleontology of Philip J. Currie*, ed. Darren H. Tanke & Kenneth Carpenter, 395-407. Life of the Past, ed. James O. Farlow. Bloomington: Indiana University Press, 2001.

Noll, Mark A. *America's God: From Jonathan Edwards to Abraham Lincoln*. New York: Oxford University Press, 2002.

Padian, Kevin and Paul E. Olsen. "Ratite Footprints and the Stance and Gait of Mesozoic Theropods." in *Dinosaur Tracks and Traces*, ed. David Gillette and Martin G. Lockley, 231-241. New York: Cambridge University Press, 1989.

Palmer, Trevor, *Controversy, Catastrophism and Evolution: The Ongoing Debate*. New York: Kluwer/Plenum, 1999.

Pick, Nancy. "Tracking a Dinosaur Pioneer," *Boston Globe Magazine*, 7 November 2004. Magazine on-line. Accessed 18 September 2005; Available from http://www.boston.com/news/globe/magazine/articles/2004/11/07/tracking_a_dinosaur_pioneer?mode=PF

_____. "Recipes for Dyspepsia." *Gastronomica: The Journal of Food and Culture* 5, no. 2 (Spring 2005): 19-22.

Quinn, Carol. "Dickinson, Telegraphy, and the Aurora Borealis." *Emily Dickinson Journal* 13, no. 2 (2004): 58-78.

Rainforth, Emma C. "Publications ~ Emma C. Rainforth." Accessed 19 September 2005. Available from http://phobos.ramapo.edu/~erainfor/publications.html.

Robinson, Gloria. "Edward Hitchcock." In *Benjamin Silliman and his Circle: Studies on The Influence of Benjamin Silliman on Science in America*, ed. Leonard G. Wilson, 49-83. New York: Science History Publications, 1979.

Rudwick, Martin J.S. *Georges Cuvier, Fossil Bones, and Geological Catastrophes: New Translations & Interpretations of the Primary Texts*. Chicago and London: University of Chicago Press, 1997.

Sarjeant, William A.S. "A name for the trace of an act: approaches to the nomenclature and classification of fossil vertebrate footprints." In *Dinosaur Systematics: Approaches and Perspectives*, ed. Kenneth Carpenter and Philip J. Currie, 299-307. New York: Cambridge University Press, 1990.

"Sketch of Edward Hitchcock." *Popular Science Monthly* 47, no. 6 (September 1895): 689-696.

Steinbock, R. Ted. "Ichnology of the Connecticut Valley: a vignette of American science in the early nineteenth century," In *Dinosaur Tracks and Traces*, 27-32.

Stiling, Rodney L. "The diminishing deluge: Noah's Flood in nineteenth century American thought." Ph.D. diss., University of Wisconsin-Madison, 1991.

Theerman, Paul. "Hitchcock, Edward." in *American National Biography*.

Tyler, William S. *A history of Amherst college during the administrations of its first five presidents, from 1821 to 1891*. Book on-line. New York, F. H. Hitchcock, 1895. Accessed 7 July 2005. Available from Richard J. Yanco's website http://www.amherst.edu/~rjyanco/amherst/history/1894tyler-ws/chapter07/menu.html

Uno, Hiroko. " 'Chemical Conviction': Dickinson, Hitchcock and the Poetry of Science." *Emily Dickinson Journal* 7, no. 2 (1998): 95-111.

Wilson, Eric. "Dickinson's Chemistry of Death." *American Transcendental Quarterly*, n.s. 12, no. 1 (March 1998): 27-43.

Wilson, Leonard G. *Lyell in America: Transatlantic Geology, 1841-1853*. Baltimore: Johns Hopkins University Press, 1998.

Wright, Conrad. "The Religion of Geology." *The New England Quarterly* 14, no. 2 (June 1941): 335-358.

Young, David. *The Discovery of Evolution*. London and Cambridge: Natural History Museum Publications, Cambridge University Press, 1992.

Young, Davis A. *The Biblical Flood: A Case Study of the Church's Response to Extrabiblical Evidence*. Grand Rapids, MI: Eerdmans Pub. Co., 1995.