

THE CREATIONISTS

From Scientific Creationism to Intelligent Design

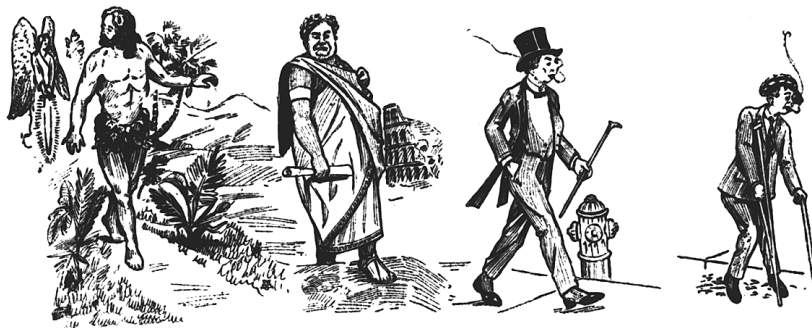
EXPANDED EDITION

RONALD L. NUMBERS

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To
Lesley Anne Numbers
and the memory of
Kesia Lynne Numbers

“A good cheerful & affectionate daughter is the greatest
blessing a man can have after a good wife.”

—*Josiah Wedgwood to R. W. Darwin, November 15, 1858,
on the occasion of the engagement of Emma Wedgwood
to Charles Darwin.*

Contents

	Introduction to the Expanded Edition	1
	Introduction	6
1	Creationism in the Age of Darwin	15
2	George Frederick Wright: From Christian Darwinist to Fundamentalist	33
3	Creationism in the Fundamentalist Controversy	51
4	Scientific Creationists in the Age of Bryan	69
5	George McCready Price and the New Catastrophism	88
6	The Religion and Science Association	120
7	The Deluge Geology Society	137
8	Evangelicals and Evolution in Great Britain	161
9	Evangelicals and Evolution in North America	180
10	John C. Whitcomb, Jr., Henry M. Morris, and <i>The Genesis Flood</i>	208

11	The Creation Research Society	239
12	Creation Science and Scientific Creationism	268
13	Deception and Discrimination	286
14	Creation Research Institutes	312
15	Creationism in the Churches	329
16	The Appeal of Creationism at Home and Abroad	351
17	Intelligent Design	373
18	Creationism Goes Global	399
	Notes	433
	Acknowledgments	570
	Index	578

Introduction to the Expanded Edition

The first edition of this book reported that, according to a 1991 Gallup poll, 47 percent of Americans, including a quarter of college graduates, believed that “God created man pretty much in his present form at one time within the last 10,000 years.” Fourteen years later, in 2005, the same organization, asking a slightly revised question, found that 53 percent of Americans affirmed that “God created human beings in their present form exactly the way the Bible describes it.” Nearly two-thirds (65.5 percent) of those polled regarded “creationism” as definitely or probably true.¹ Other surveys discovered similar or higher levels of support for creationism, however defined. In 2005 *Newsweek* revealed that 80 percent of Americans believed “that God created the universe,” and the Pew Research Center found that “nearly two-thirds of Americans say that creationism should be taught alongside evolution in public schools.” Most surprising of all was the discovery that large numbers of high-school biology teachers—from 30 percent in Illinois and 38 percent in Ohio to a whopping 69 percent in Kentucky—supported the teaching of creationism.²

The Supreme Court’s decision in 1987 effectively ended efforts to

mandate the inclusion of creationism in public-school curricula, but it did little to slow down creationist initiatives to undermine evolution. Instead of agitating for balanced-treatment acts at the state level, creationists refocused much of their energy on individual schools and school districts, where in many instances considerable support for creationism already existed. In the early 1990s the National Center for Science Education (NCSE), which monitored creationist endeavors throughout the country, warned that people unfamiliar with precollegiate education would “be surprised at the amount of official antievolutionism that is found there, especially among administrators.” In the fall of 1992 the center drew attention to “a sharp surge upwards” in creationist attacks on evolution. These often took the form of calling for downgrading the status of evolution from “fact” to “theory” or for presenting students with “evidence against evolution,” a notion the director of the center, Eugenie C. Scott, dismissed as “merely ‘scientific’ creationism in sheep’s clothing.”³

Some educators employed novel solutions to solve the recurring evolution problem. In response to complaints about the inclusion of evolutionary cosmology in elementary-school textbooks, the superintendent of schools in Marshall County, Kentucky, ordered that the offending two pages be glued together. The Cobb County school district in suburban Atlanta, Georgia, went directly to the publisher of a troublesome fourth-grade text and asked that a chapter, “The Birth of Earth,” be deleted. Modern electronic publishing allowed Macmillan/McGraw Hill, the publisher, to excise seventeen pages, thereby producing a custom-made text exclusively for the students of Cobb County.⁴

In Alabama the state school board in 1995 voted six to one in favor of inserting a disclaimer in all biology textbooks used in the state. Biology textbooks in Alabama subsequently began arriving from the publishers with the message shown on page 3 pasted into the front. The Republican governor, Fob James, who presided over the board, strongly backed the disclaimer, saying that he personally believed the biblical account of the origin of life to be true.⁵

In the 1990s controversies over creationism erupted not only in Georgia, Kentucky, and Alabama but in Virginia, Pennsylvania, New Hampshire, Ohio, Indiana, Michigan, Wisconsin, New Mexico, California, and Washington. Tennessee legislators defeated a bill, at first expected to “blast through the House Education Committee like a rocket,”

A MESSAGE FROM THE ALABAMA STATE BOARD OF EDUCATION

This textbook discusses evolution, a controversial theory some scientists present as a scientific explanation for the origin of living things, such as plants, animals and humans.

No one was present when life first appeared on earth. Therefore, any statement about life's origins should be considered as theory, not fact.

The word "evolution" may refer to many types of change. Evolution describes changes that occur within a species. (White moths, for example, may "evolve" into gray moths.) This process is microevolution, which can be observed and described as fact. Evolution may also refer to the change of one living thing to another, such as reptiles into birds. This process, called macroevolution, has never been observed and should be considered a theory. Evolution also refers to the unproven belief that random, undirected forces produced a world of living things.

There are many unanswered questions about the origin of life which are not mentioned in your textbook, including:

- Why did the major groups of animals suddenly appear in the fossil record (known as the "Cambrian Explosion")?
- Why have no new major groups of living things appeared in the fossil record for a long time?
- Why do major groups of plants and animals have no transitional forms in the fossil record?
- How did you and all living things come to possess such a complete and complex set of "Instructions" for building a living body?

Study hard and keep an open mind. Someday, you may contribute to the theories of how living things appeared on earth.

From 1996 to 2001 this message appeared in public-school biology textbooks used in Alabama. A revised warning label replaced it in 2001. Copy courtesy of Jack D. Ellis.

that would have allowed the firing of any teacher who presented evolution as fact rather than theory. Such activity prompted one frustrated anticreationist to exclaim that “Creationism is like a vampire, and every time you think the thing is finally dead, someone pulls the damned stake out again.”⁶ Various state Republican parties added creationist planks to their platforms. In all regions of the country—North, South, East, and West—creationists stood for election to local school boards. And all this happened before “intelligent design” made its presence felt, a development discussed in Chapter 17.

After decades of having no major-league scientists in their midst, young-earth creationists celebrated when it came to light that Raymond V. Damadian (b. 1936), the inventor of magnetic resonance imaging (MRI), was one of them. Before long he was serving on the advisory boards of both the Institute for Creation Research and Answers in Genesis. In 2003, however, when the Nobel Foundation awarded its prize in medicine or physiology to two scientists for their “discoveries concerning magnetic resonance imaging,” Damadian was left unrecognized. The reasons for the snub were unclear, but conservative Christians suspected that Damadian’s creationism may have been a factor.⁷

The editor of *Science*, writing in 2005, gave a pessimistic account of the recent history of evolution. Just seven years earlier, when the National Academy of Sciences published their booklet *Teaching about Evolution and the Nature of Science*, he had hoped that things might change for the better:

Well, things changed in the wrong direction: Alternatives to the teaching of biological evolution are now being debated in no fewer than 40 states. Worse, evolution is not the only science under such challenge. In several school districts, geology materials are being rewritten because their dates for Earth’s age are inconsistent with scripture (too old).

Could it be, he wondered, that we are witnessing the end of the Enlightenment. I, for one, hope not.⁸

This expanded version of *The Creationists* contains two new chapters, devoted respectively to the most striking developments of the past decade and a half: the rise of the intelligent-design movement and the global spread of antievolutionism. Except for making a few minor changes, I

have left the text of the first edition unrevised. Had I chosen to rewrite the book, I could have benefited from a considerable amount of fresh scholarship. I myself have published a number of additional studies, including an essay exploring the changing meanings of the term “creationism,” a topic I inexplicably overlooked in 1992.⁹ Two former students of mine, Rodney L. Stiling and Edward J. Larson, have also contributed significantly to the literature on creationism, Stiling with a prequel to this book, Larson with a Pulitzer Prize-winning analysis of the Scopes trial.¹⁰ Just when it looked like there was nothing new to say about this trial and the antievolution movement in the 1920s, there appeared a number of innovative studies, looking at such topics as African-American attitudes, popular representations, and theological concerns.¹¹ The late-century outbreak of creationism has likewise attracted considerable scholarly attention since 1992.¹² In view of the robust revolt against evolution that we are now witnessing, there is no reason to anticipate that interest in the topic will subside in the near future.

RLN
Madison, Wisconsin
March 1, 2006

Introduction

Within a couple of decades of the publication of Charles Darwin's landmark book *Origin of Species* (1859), the idea of organic evolution had captivated most British and American scientists and was beginning to draw favorable comment from religious leaders on both sides of the Atlantic. By the late nineteenth century, evolutionary notions were infiltrating even the ranks of evangelical Christians, and, in the opinion of many observers, belief in special creation seemed destined to go the way of the dinosaur. But contrary to the hopes of liberals and the fears of conservatives, creationism did not become extinct. Many English-speaking Christians, particularly in North America, remained true to a traditional reading of Genesis and from time to time, most notably in the 1920s and since the 1960s, mounted campaigns to contain the spread of evolutionary theory. An overwhelming majority of Americans saw no reason to oppose the teaching of creationism in public schools, and according to a 1991 Gallup poll 47 percent, including a fourth of the college graduates, continued to believe that "God created man pretty much in his present form at one time within the last 10,000 years."¹ Two states, Arkansas and Louisiana, passed laws mandating equal treat-

ment for “creation science” and “evolution science.” Although the courts subsequently ruled these particular statutes to be unconstitutional, the creationist movement showed few signs of slackening as it entered the 1990s.

Besides the unexpected revival in recent years, which caught even enthusiasts by surprise, the most striking development in the history of twentieth-century creationism is the ascendancy since the early 1960s of a distinctive brand of creationism known as “scientific creationism” or “creation science.” As defined in the 1981 Arkansas law,

Creation-science includes the scientific evidences and related inferences that indicate: (1) Sudden creation of the universe, energy, and life from nothing; (2) The insufficiency of mutation and natural selection in bringing about development of all living kinds from a single organism; (3) Changes only within fixed limits of originally created kinds of plants and animals; (4) Separate ancestry for man and apes; (5) Explanation of the earth’s geology by catastrophism, including the occurrence of a worldwide flood; and (6) A relatively recent inception of the earth and living kinds.

Advocates of this view—essentially biblical creationism stripped of explicit references to God, Adam, and Noah—read the first chapters of Genesis in a way that allows for no life on earth before Eden and no death before the Fall.²

Until the last few decades most creationists would have regarded such notions as unnecessarily extreme. By the late nineteenth century even the most conservative Christian apologists readily conceded that the Bible allowed for an ancient earth and pre-Edenic life. With few exceptions, they accommodated the findings of historical geology either by interpreting the days of Genesis 1 to represent vast ages in the history of the earth (the so-called day-age theory) or by separating a creation “in the beginning” from a much later Edenic creation in six literal days (the gap theory). Either way, they could defend the accuracy of the Bible while simultaneously embracing the latest geological and paleontological discoveries. William Jennings Bryan, the much misunderstood leader of the post-World War I antievolution crusade, not only read the Mosaic “days” as geological “ages” but allowed for the possibility of organic evolution—so long as it did not impinge on the supernatural origin of Adam and Eve. Harry Rimmer, the flamboyant evangelist who occupied center stage on the creationist platform between the great wars,

squeezed millions of years into the presumed gap in the Genesis narrative and drained the deluge story of all but local significance.

The creation scientists, by contrast, compress the history of life on earth into less than ten thousand years. To accomplish this, they attribute most of the fossil record to the brief period of the flood and its aftermath. They believe that the majority of plants and animals buried sequentially in the stratified rocks once lived together in the antediluvian world; thus these relics do not represent successive populations of flora and fauna spanning millions of years, as evolutionists and most other creationists would assert. In such classics of creation science as George McCready Price's *New Geology* (1923) and John C. Whitcomb, Jr., and Henry M. Morris's *Genesis Flood* (1961), geological issues push biological ones to the periphery, and the Noachian deluge tends to eclipse the Adamic creation in importance. "The Genesis Flood is the real crux of the conflict between the evolutionist and creationist cosmologies," declares the text *Scientific Creationism* (1974).

If the system of flood geology can be established on a sound scientific basis, and be effectively promoted and publicized, then the entire evolutionary cosmology, at least in its present neo-Darwinian form, will collapse. This, in turn, would mean that every anti-Christian system and movement (communism, racism, humanism, libertinism, behaviorism, and all the rest) would be deprived of their pseudo-intellectual foundation.³

The chief architect of flood geology, a term virtually synonymous with creation science and scientific creationism, was the self-described geologist George McCready Price, who during the early decades of the twentieth century stood virtually alone in insisting on the recent appearance of life and on a flood that rearranged the features of the earth. Although his "new catastrophism" received nearly universal acclaim from fellow creationists, he won few true converts to flood geology outside his own small Seventh-day Adventist sect. It was not until the creationist renaissance of the 1960s, marked by the publication of Whitcomb and Morris's *Genesis Flood* and the subsequent birth of the Creation Research Society, that fundamentalists in large numbers began to read Genesis in the Pricean manner and to equate his views with the intended message of Moses. By the 1980s the flood geologists had virtually co-opted the name creationism to describe the once marginal views of Price.⁴ This remarkable shift in the prevailing meaning of creationism—from the theo-

logically orthodox day-age and gap theories that allowed the history of life on earth to span millions of years to a doctrine of suspect provenance (because of its Adventist origins) that compressed earth history into no more than ten thousand years—serves as the focus of my study.

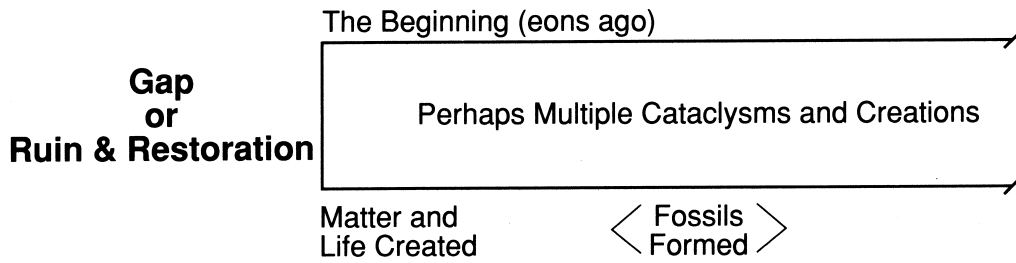
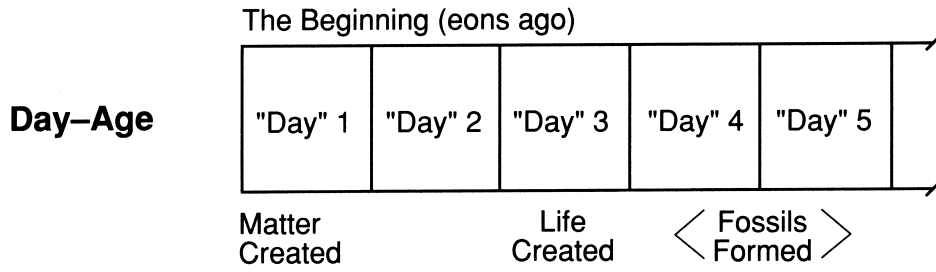
In writing this history, I have chosen to concentrate on those creationists who possessed, or claimed to possess, scientific credentials. This might strike some readers as an odd choice of topic for a historian of science, but I would submit that one of the best ways to learn about the history of “science” is to explore how interested parties have contested its boundaries. Many books in recent years have sought to discredit creationism scientifically or theologically, but only a few have examined the movement historically, and then primarily from a legal or pedagogical perspective.⁵ None has looked carefully at the intellectual origins of scientific creationism. Consequently, even relatively informed persons tend to overlook the substantial changes in creationist thought during the twentieth century and the intense controversies precipitated by those changes. The common assumption seems to be that one creationist is pretty much like another.⁶ As we shall see, nothing could be further from the truth.

Although scientifically trained creationists, especially in the biological and earth sciences, had become an endangered species by the early years of the century, they gradually reappeared as more and more fundamentalist youth sought higher education. During the 1920s, creationists relied for scientific expertise on a few teachers in Christian colleges (none with even a master’s degree in biology or geology), on a physician or two, and on a medical-school dropout. In 1963, when the Creation Research Society was organized, five of its ten founders held earned doctorates in biology from major universities, and two others possessed Ph.D.s in science or engineering. Not surprisingly, these scientifically credentialed creationists frequently enlisted scientific arguments to support their views. But to a man they embraced creationism primarily from religious conviction. To illuminate these beliefs and to trace the tangled religious roots of creationism—from Baptist and Presbyterian to Lutheran and Adventist—I have included biographical sketches of a number of the leading creationists.

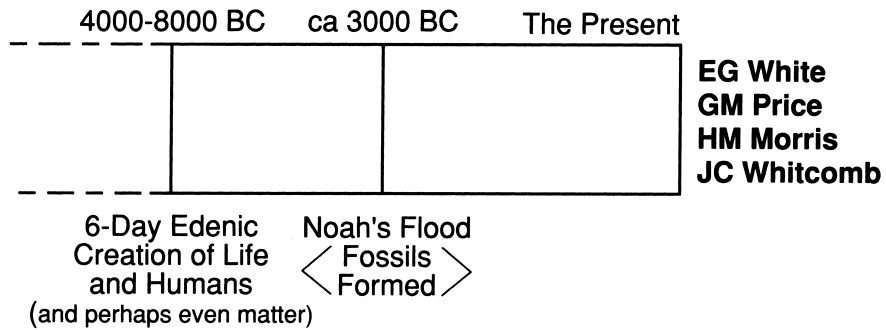
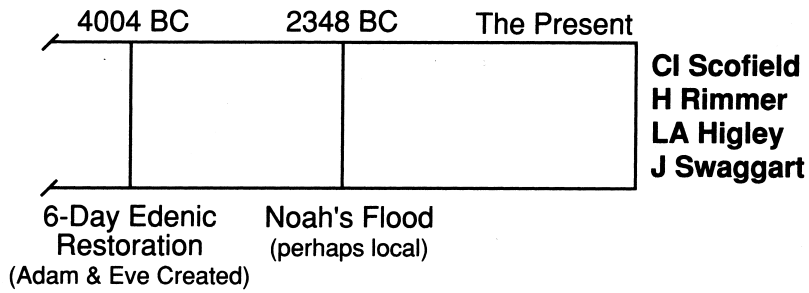
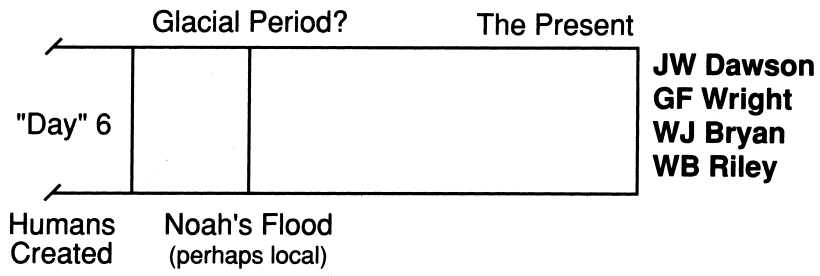
Readers acquainted with such works as Andrew Dickson White’s influential *History of the Warfare of Science with Theology in Christendom* (1896) will not be surprised to learn that the history of modern creationism in-

CREATIONIST INTERPRETATIONS OF GENESIS

Interpretations



Advocates



cludes some of the fiercest skirmishes in the annals of science and religion. But only those familiar with the recent critiques of the warfare thesis will be prepared to accept my claim that the creationist conflicts rarely conformed to the battle lines drawn by White.⁷ Rather than finding clerics arrayed in simple opposition to scientists, we discover conflicts of a different sort: psychological, as creationists struggled to reconcile the apparently conflicting claims of science and Scripture; and social, as they quarreled with one another over competing scientific and biblical interpretations or contested the boundaries of science and religion with evolutionists in courthouses, legislative halls, and school-board rooms. In virtually every public battle, even when creationists squared off against evolutionists, scientists and preachers could be found on both sides, and sometimes in unexpected numbers. For example, in the Arkansas creation-evolution trial in 1981, the plaintiffs, who opposed creation science, came overwhelmingly from the ranks of religious organizations, while virtually all of the experts testifying in support of creationism possessed graduate degrees in science. The irony prompted the Protestant theologian Langdon Gilkey, who served as a witness for the plaintiffs, to observe that the only “warfare” in Little Rock found “liberal religion and liberal science on the one side, and absolutist religion and its appropriate ‘science’ on the other.”⁸

I should also warn readers that my aim is not to expose the scientific defenders of creationism as “pseudoscientists.” Although such efforts no doubt have their place—one of my favorite journals is the *Skeptical Inquirer*—as a historian I am much more interested in how persons and parties used “science” and “pseudoscience” to further their ends than in judging whether they employed these labels appropriately by the standards of the 1990s. Lately many scholars, including the philosopher of science Larry Laudan and the sociologist of science Thomas F. Gieryn, have shown the sterility of efforts to demarcate between science and pseudoscience on analytical grounds. Laudan has gone so far as to dismiss the demarcation problem as “a pseudo-problem.”⁹ I agree, but hasten to add that this says nothing about the *practical* and *historical* significance of attempts at demarcation. On the basis of criteria (including falsifiability, testability, tentativeness, and naturalness) suggested by the philosopher-historian Michael Ruse, the federal judge in the Arkansas case declared creation science to lie outside the domain of science and within the realm of religion. This allowed him to rule that the manda-

tory teaching of creationism was unconstitutional because it violated the First Amendment requirement that church and state be separate.¹⁰ Merely showing creation science to be “bad science” would have been insufficient in this case, because the constitution does not ban the teaching of bad science in public schools.

Over the past decade or so I have lectured on the history of creationism to many audiences, both academic and general. On almost every occasion someone has asked me to reveal my own position on the scientific merits of creationism or to disclose my religious beliefs. I would like to think that readers of this book will accept or reject my rendering of the creationist story on the basis of the evidence and arguments I present, not because of my personal convictions. But as a concession to the universal curiosity about such matters, I offer a brief autobiography.

Born and reared in a fundamentalist Seventh-day Adventist family of ministers, I learned Price’s version of earth history at my parents’ knees. I subsequently attended Adventist church schools from first grade through college, and though I majored in science, I saw no reason to question the claims of strict creationism. In fact, I do not recall ever doubting the recent appearance of life on the earth until the late 1960s, while studying the history of science at the University of California at Berkeley. I vividly remember the evening I attended an illustrated lecture on the famous sequence of fossil forests in Yellowstone National Park and then stayed up much of the night with a biologist friend of like mind, Joe Willey, first agonizing over, then finally accepting, the disturbing likelihood that the earth was at least thirty thousand years old. Having thus decided to follow science rather than Scripture on the subject of origins, I quickly, though not painlessly, slid down the proverbial slippery slope toward unbelief. In 1982, when attorneys for both sides in the Louisiana creation-evolution trial requested my services as a possible expert witness, I elected to join the ACLU team in defending the constitutional wall separating church and state. In taking my pretrial deposition, Wendell R. Bird, the creationist lawyer who had tried to recruit me for his side, devoted two lengthy sessions to probing the limits of my historical knowledge and the thinness of my religious beliefs. On the basis of this inquisition Bird publicly labeled me an “Agnostic.”¹¹ The tag still feels foreign and uncomfortable, but it accurately reflects my theological uncertainty.

Although I no longer believe in creationism of any kind, I am strongly

committed to treating its advocates with the same respect I might accord evolutionists. (As a constant reminder to do so, I have kept above my desk a framed handbill from the early 1940s announcing a public lecture on “God’s Answer to Evolution: Are Men and Monkeys Relatives?” The featured speaker was my father, Raymond W. Numbers, then holding a series of evangelistic meetings in the Kansas City Canvas Tabernacle.) For too long now students of science and religion have tended to grant the former a privileged position, often writing more as partisans than historians and grading religious “beliefs” by how much they encouraged or retarded the growth of scientific “knowledge.” Recently we have heard persuasive calls for a more even-handed treatment.¹² But even academics who would have no trouble empathetically studying fifteenth-century astrology, seventeenth-century alchemy, or nineteenth-century phrenology seem to lose their nerve when they approach twentieth-century creationism and its fundamentalist proponents. The prevailing attitude, colorfully expressed at one professional meeting I attended, is that “we’ve got to stop the bastards.” In other words, although many scholars seem to have no trouble respecting the unconventional beliefs and behaviors of peoples chronologically or geographically removed from us, they substitute condemnation for comprehension when scrutinizing their own neighbors. I think it is profitable to get acquainted with the neighbors, especially so if we find them threatening.

RLN
Madison, Wisconsin
July 1, 1991

ONE



Creationism in the Age of Darwin

Within twenty years after the publication of Charles Darwin's *On the Origin of Species by Means of Natural Selection* in 1859, nearly every naturalist of repute in North America had embraced some theory of organic evolution. The situation in Great Britain looked equally bleak for creationists, and on both sides of the Atlantic liberal churchmen were beginning to follow their scientific colleagues into the evolutionist camp. Although the majority of Bible-believing Christians undoubtedly remained true to the idea of a specially created world, evolution was infiltrating even the ranks of evangelicals by the closing years of the nineteenth century. As early as 1880 the editor of one American religious weekly estimated that "perhaps a quarter, perhaps a half of the educated ministers in our leading Evangelical denominations" believed "that the story of the creation and fall of man, told in Genesis, is no more the record of actual occurrences than is the parable of the Prodigal Son."¹ When in 1910 the early fundamentalists sought a scientific champion to meet the threat of evolution, the best they could find was George Frederick Wright, a cleric-geologist who had risen to prominence a few decades earlier as an apologist for Christian Darwinism.

This chapter surveys the scientific and religious responses to organic evolution in the half-century following the appearance of Darwin's famous book, focusing in particular on scientific and theological resistance to evolution among conservative American Protestants. Contemporary readers who associate creationism with the teachings of the so-called scientific creationists will no doubt be surprised by the small number of nineteenth-century creationist writers who subscribed to a recent creation in six literal days and the even greater rarity of those who attributed the fossil record to the Noachian flood. Creationists of the Victorian era generally assimilated the findings of historical geology to such an extent that today they seem intellectually closer to the theistic evolutionists of their time than to the scientific creationists of the late twentieth century.

Evolution Comes to America

Confusion about the distinction between creation and evolution dates back at least to the publication of Darwin's *Origin of Species* (1859), which explained speciation in terms of the struggle to survive and propagate among organisms that differ in their abilities because of randomly occurring variations. Although one of Darwin's principal goals was "to overthrow the dogma of separate creations," he invoked at least one creative act for the purpose of getting life going and allowed for the possibility of several more interventions. "I believe that animals have descended from at most only four or five progenitors, and plants from an equal or lesser number," he wrote in a widely quoted passage, adding that analogy would lead him to believe "that probably all the organic beings which have ever lived on this earth have descended from some one primordial form, into which life was first breathed." This concession to conventional views prompted the religiously orthodox American botanist Asa Gray (1810–1888), Darwin's foremost American disciple, to suggest that because his British friend had accepted "a supernatural beginning of life on earth," he should be willing to allow another "special origination" in connection with the appearance of humans. Darwin, who soon came to regret his use of "Pentateuchal" language in the *Origin of Species*, rejected not only this advice but also Gray's proposal to attribute the inexplicable variations in Darwin's scheme to divine providence. In *Variation of Animals and Plants under Domestication* (1868),

Darwin announced that “however much we may wish it, we can hardly follow Professor Asa Gray in his belief” in divinely guided evolution.²

By the time Darwin penned his treatise *The Descent of Man* (1871), he no longer felt the need to truckle to public opinion by including veiled references to the Creator. In uncompromisingly naturalistic language that contrasted sharply with the biblical story of Adam and Eve, Darwin offered his readers a new genealogy:

Man is descended from a hairy quadruped, furnished with a tail and pointed ears, probably arboreal in its habits, and an inhabitant of the Old World. This creature, if its whole structure had been examined by a naturalist, would have been classed among the Quadrumana, as surely as would the common and still more ancient progenitor of the Old and New World monkeys. The Quadrumana and all the higher mammals are probably derived from an ancient marsupial animal, and this through a long line of diversified forms, either from some reptile-like, or some amphibian-like creature, and this again from some fish-like animal.

Darwin tried to soften this blow to human pride by pointing out that if humans no longer laid claim to a pedigree “of noble quality,” at least they could take comfort from having one “of prodigious length.” But some of his readers reacted less cheerfully to the news of tailed ancestors. As one critic caustically complained, in contrast to the biblical record, which “places a crown of honor and dominion on the brow of our common humanity . . . Darwinism casts us all down from this elevated platform, and herds us all with four-footed beasts and creeping things. It tears the crown from our heads; it treats us as bastards and not sons, and reveals the degrading fact that man in his best estate—even Mr. Darwin—is but a civilized, dressed up, educated monkey, who has lost his tail.”³

In evaluating the response of Americans to the *Origin of Species*, we must distinguish between Darwin’s twin goals of showing that species had not been supernaturally created and of demonstrating that natural selection had been the chief agent in effecting evolutionary change. By the mid-1870s the majority of professional naturalists in America had embraced the evolutionary origin of species, but many—perhaps most—of them remained skeptical about the primacy of natural selection in the evolutionary process, emphasizing instead such factors as the inheritance of environmentally induced characteristics.⁴

The rapid conversion from special creation to evolution occurred in part because of the empirical evidence Darwin and others marshaled in favor of the transmutation of species, but equally important was the growing self-consciousness among biological scientists over their continued reliance on miraculous explanations at a time when natural laws had supplanted divine activity in virtually every other area of science. In reviewing the *Origin of Species* for the *Atlantic Monthly* in 1860, Asa Gray addressed the question of why most naturalists no longer felt comfortable relying on the Genesis account of creation to explain speciation:

Sufficient answer may be found in the activity of the human intellect, “the delirious yet divine desire to know,” stimulated as it has been by its own success in unveiling the laws and processes of inorganic Nature. . . . Surely the scientific mind of an age which contemplates the solar system as evolved from a common revolving fluid mass—which, through experimental research, has come to regard light, heat, electricity, magnetism, chemical affinity, and mechanical power as varieties or derivative and convertible forms of one force, instead of independent species—which has brought the so-called elementary kinds of matter, such as the metals, into kindred groups, and pertinently raised the question, whether the members of each group may not be mere varieties of one species—and which speculates steadily in the direction of the ultimate unity of matter . . .—the mind of such an age cannot be expected to let the old belief about species pass unquestioned.⁵

In similar manner, the American astronomer Simon Newcomb (1835–1909) reduced the reasons for choosing evolution over creation to one basic principle: “We are not to call in a supernatural cause to account for a result which could have been produced by the action of the known laws of nature.”⁶ Thus, despite continuing debates about the exact mechanism responsible for organic development, the negative sentiment against special creation, combined with the positive evidence for the transmutation of species, created an intellectual climate favorable to the acceptance of evolution.

After a slow start in the early 1860s, the idea of organic evolution, effectively promoted by Gray, quickly won the allegiance of American biologists and geologists. In 1872, less than thirteen years after the appearance of the *Origin of Species*, the paleontologist Edward Drinker Cope (1840–1897) observed that “the modern theory of evolution has been