

Chapter 4

Seventh-day Adventism, Geology, and the Flood: An Historical Perspective from 1900 to 2015

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Introduction

There were five major nineteenth-century events which would determine how Seventh-day Adventism would react to the findings of geological science in the twentieth century and beyond. The first relates to a vision by Ellen White, one of the founders of the Seventh-day Adventist Church, on Creation and the biblical Flood which was recorded in Volume 3 of *Spiritual Gifts* in 1864. It was in this volume that the six literal days of creation, the seventh-day Sabbath, and a world-wide Flood of catastrophic proportions were linked and affirmed.¹ Taking the findings of geology seriously, in particular findings that did not support the three principles given above, was regarded as the “worst kind of infidelity.”² A somewhat pessimistic view of science was portrayed in the words: “Human science can never account for his (God’s) wondrous works”³; and those who “seek to account for God’s creative works upon natural principles...are upon a boundless ocean of uncertainty.”⁴ Only a geology that was in harmony with biblical history was acceptable. Ellen White has written: “I have been shown that without Bible history, geology can prove nothing.”⁵

The second major event that was to have an impact on the church was the geological discovery that the Earth appeared to be much older than the commonly accepted six thousand years calculated by Church of Ireland Archbishop Ussher and published in 1650 in his biblical

chronology. Based on commonly observed rates of degradation of a cliff face, Charles Darwin expressed a commonly held view of geology in the nineteenth century as follows:

Hence, under ordinary circumstances, I conclude that for a cliff 500 feet in height, a denudation of one inch per century for the whole length would be an ample allowance. At this rate, on the above data, the denudation of the Weald (an area in south east England situated between the parallel chalk escarpments of the North and South Downs) must have required 306,662,400 years; or say 300,000,000 years.⁶

By 1820 Jean Fourier, the great French mathematician, had determined a mathematical formula that could calculate how long it would have taken the surface of the earth to cool from a completely molten state to its current form. The formula produced an age of 100 million years.⁷ Harmonising geologists such as William Buckland (1784–1856), Adam Sedgwick (1785–1830), and William Conybeare (1787–1857), anxious to retain their Christian faith and biblical belief, accommodated these longer ages by considering the seven-day creation week as representing seven periods of millions of years. They also considered that millions of years could have separated Genesis 1:1 and Genesis 1:2. By 1864 Ellen White had already reacted to this proposition: “But the infidel supposition, that the events of the first week required seven vast, indefinite periods for their accomplishment, strikes directly at the foundation of the Sabbath of the fourth commandment.”⁸ Thus the age issue was seen to challenge the very *raison d'être* of Seventh-day Adventism.

The third major event challenging Adventism was the growing recognition within the geological community of the nineteenth century that one great catastrophic Flood in the past could not explain the surface features of our planet. The transition from belief to non-belief in the nineteenth century regarding the significance of a global Noachian Flood was well described by the New England geology teacher Frederick Hall in 1839: “[Fifty years ago] wherever a deep gorge was noticed between two mountains or hills—wherever a coal bed was discovered—wherever a petrified log or fish was seen, whether on an extensive plain or on the Pyrenees, the Alps or the Andes, there the naturalist, as well as the theologian, would promptly remark, ‘there are the visible effects of the Noachian deluge’ ... [Hardly fifty years later Christian geologists were exclaiming] that *no* certain traces—no distinct footmarks of the scripture Flood—are to

be found on the face or in the crust of our planet.”⁹ With the discovery of past successive ice ages, what had universally been perceived as diluvial gravel was increasingly being reinterpreted as glacial drift left behind by the fluctuating expansions of continental-scale glaciers. In view of Jesus’ reference in the gospel of Luke to Noah’s global Flood in the context of the Second Advent this change in geological thinking appeared to strike directly at the heart of that belief. Thus another *raison d’être* for Seventh-day Adventism was under challenge.

The fourth major event was the development of what became known as the geologic column, which was almost in its final form by 1860. In the column rock formations were classified into relative time periods, from the earliest to the most recent. The fossils contained in the formations were the remains of living organisms, ranging from the simplest types in the earlier rock layers to more complex organisms in the more-recent rock layers. The geologic column prepared by Edward Hitchcock (1860) and which was contemporary with pioneer Adventists in North America is represented in Figure 1. It is to the geologist what the Periodic Table is to the chemist: a major classification tool. However, because it had a time factor attached to it which suggested that living things came into existence over a period of millions of years rather than over a few days, as detailed in the creation account of Genesis 1, it was to present a major challenge to Seventh-day Adventists.

The fifth factor was the publication of Charles Darwin’s *The Origin of Species*¹⁰ in 1859 and *The Descent of Man*¹¹ in 1871. These works were to have a lasting impact on the Bible-believing world, including the Seventh-day Adventist church. The emphasis on descent of species with modification through natural selection over a vast period of time led Adventist author Alonzo Jones to declare in 1885 that “without geology, evolution can have no place.”¹² This was in spite of their fundamentally independent development. Hence Jones lumps evolutionary biology and geology together and concludes:¹³

And thus the two ‘falsely so-called’ sciences unite, not only to destroy faith in the Word of God, but to rob the creator of his prerogative and remove him from his throne. Geological science goes before and upon the basis of its deductions demands that we give up the *first chapter of Genesis*. With this as its ‘indispensable basis’ evolution follows after, and upon its deductions demands that we give up the *whole bible*.

Rock Types	Life Types	Relative Time
CENOZOIC	Human fossils	Recent
Alluvium		
Tertiary		
MESOZOIC		
Cretaceous		
Jurassic		
Triassic		
PALEOZOIC		
Permian	M	
Carboniferous		
Devonian	B	
Upper Silurian		
Lower Silurian	D	
Cambrian		
AZOIC		
	R	
	A	
	T	
		Millions of years
		Ancient

Figure 1. The rock types of the geologic column in 1860 after Hitchcock¹⁴. The life types shown in Brand (2009)¹⁵: M = mammals; B = birds; D = dinosaurs; R = reptiles; A = amphibians; T = trilobites.

How were committed, Bible-believing Christians who were also educated in the sciences to relate to a situation such as this? As noted, harmonising geologists had dealt with vast ages in the rocks by allowing the seven creation days of Genesis 1 to represent seven immense indefinite periods of time. From there, it was not a large step to deal with the extensive spread of living organisms across the heretofore unimagined range of the geologic column by considering God to have performed his creative activity over evolutionary time rather than over a few days as represented by a literal interpretation of Genesis 1. Thus was born the concept of *theistic evolution* or as Francis Collins¹⁶ prefers to call it, *BioLogos*. Because this concept directly challenged a literal interpretation of the Genesis account of creation, it would remain a thorn in the side of Seventh-day Adventists through to the twentieth century and beyond.

Why, we might ask, has Seventh-day Adventism been so averse to taking the theistic evolution route? While early and medieval Christianity recognised that scripture could be read in a literal sense, precedence was given to its spiritual sense.¹⁷ However, when the

Protestant Reformation insisted that the Bible should be accessible to lay congregations and not just to the scholars of the church, priority was given to the literal reading of scripture, though the spiritual sense was still regarded as important. With Seventh-day Adventism's having emerged from Protestant roots, it became committed to the literal sense of scripture, as did many other orthodox Protestant denominations. This fact, combined with the issues discussed above, was to set the scene for the next century.

Into this portentous situation stepped the intriguing figure of George McCready Price. It was the dawn of the twentieth century when this daring, self-taught geologist, committed to Ellen White's metanarrative of Creation and the Flood, set out staunchly to attack all four of the scientific positions of the nineteenth century: a vast age for the earth well beyond 6,000 years; the diminishing significance of a global Flood; the geologic column that suggested a succession of rock types and life types; and evolutionary hypotheses, in particular theistic evolution.

George McCready Price: The Adventist Tone-Setter for the Twentieth Century

George McCready Price (1870-1963), a Canadian, was never formally educated as a geologist and never developed the skills of a field geologist. He was, however, a voracious reader of geological texts and government geological survey reports. This led, during his lifetime, to the publishing of over 30 books as well as 350 articles, many of which were published in the *Review and Herald* and *The Signs of the Times*. His four major books dealing with geological issues were: *Outlines of Modern Christianity and Modern Science* (1902)¹⁸; *Illogical Geology: The Weakest Point in the Evolution Theory* (1906)¹⁹; *The Fundamentals of Geology and Their Bearings on the Doctrine of a Literal Creation* (1913)²⁰; and *The New Geology: A Textbook for Colleges, Normal Schools and Training Schools, and for the General Reader* (1923).²¹ Ronald Numbers²² lists Price's academic appointments from 1907 to 1938 which include positions at most of the major Seventh-day Adventist colleges of the time. Harold Clark²³ described Price as a "Crusader for Creation" in his biography of Price by that name and Carl Weinberg called Price the "godfather of the modern creationist movement."²⁴

Price held Ellen White in high esteem and consequently her metanarrative of Creation and the Flood formed the foundation, either explicitly or implicitly, of all his writings on the topic of science and religion. This is clear when he states his mantra in his first book publication as follows:

No believer in the Sabbath as the divine memorial of creation's week will hesitate to give as the distinct, positive teaching of Genesis that life has been on our globe only some six or seven thousand years; and that the earth as we know it, with its teeming animal and vegetable life, and man as the crowning work of all, was brought into existence in six literal days; and let scientists overthrow it if they can.²⁵

Price clearly echoed Ellen White's²⁶ reminders that the supposition of a vast age for the Earth proposed by infidel geologists compromises the Sabbath; that the Earth is no older than six to seven thousand years; and that the Earth was created in six literal days. In a later publication Price declared himself particularly taken by Ellen White's "revealing word pictures of the Edenic beginning of the world, of the fall and world apostasy, and of the Flood."²⁷ He sought to show that the geological features of the Earth were best interpreted in terms of the global Mosaic Flood; that the geology of the time was not a real science; that the geologic column was an embarrassing mistake because it did not support the idea of the succession of either rock types or life forms; and finally that the theory of evolution did not have the support of geology and thus was not a viable alternative to the creation model according to Genesis.

To accomplish his objectives, Price searched reputable geology texts and reports in detail in an effort to find support for his arguments, at times taking data out of context. In spite of this dubious practice, he was a skilful writer and communicator and made a deep impression on his audiences. Martin Gardner astutely observed, "So carefully reasoned are Price's speculations, so bolstered with impressive geological erudition, that thousands of Protestant fundamentalists today accept his work as the final word on the subject. Even the sceptical reader will find Price difficult to answer without considerable background in geology."²⁸ It was this talent that was to capture the attention of Seventh-day Adventists for at least the first sixty years of the twentieth century. In what follows some of the core arguments that cemented Price's position as godfather of the creation movement are described.

Geology as a Science

The status of geology as a scientific discipline has not always been accepted even within the scientific community and Price homed in on this fragile situation to reap a benefit. It is probably best to quote him in his own words so the flavour of his message can be captured. In the preface to his *New Geology* he wrote,

In various ones of the natural sciences, it has often happened that the theories of one generation have become the dogmatic doctrines of the next. Fortunately, in such sciences as physics, chemistry, and bacteriology, theories are usually short-lived, unless they rest on a solid basis of facts. Fortunately also, the prime postulates at the basis of most of the natural sciences are merely those basic truths of experience and common sense which are capable of being checked up by reality almost at an instant's notice.

In geology, however, we have long labored under the handicap of having several wide-sweeping assumptions lying at the very threshold of our investigations; and these assumptions have shown a phenomenal tenacity of life, because they were of such a nature that they could not readily be checked up by either experience or experiment.²⁹

Price here reflects a common view held in the United States at this time which combined Francis Bacon's (1561–1626) philosophy of nature, based on simple observation and experiment, with the 'common sense' ideas of the eighteenth century Scottish philosopher Thomas Reid (1710–1796). Facts wrought through the senses were to take precedence over assumptions, hypotheses, and theories.³⁰ Price was committed to this view and dedicated his *Fundamentals of Geology* to Francis Bacon and Isaac Newton. Consequently, geology was considered to be at a lower level of sophistication than physics and chemistry and hence was not to be relied upon to present the truth. The title page of Price's *Illogical Geology* (1906) contains the following quote from Henry Howarth: "It is a singular and a notable fact, that while most other branches of science have emancipated themselves from the trammels of metaphysical reasoning, the science of geology remains imprisoned in *a priori* theories."³¹

Among the *a priori* theories, assumptions, or hypotheses that Price chose as his focus of attack were: the theory of the molten interior of the Earth (because this was the basis of some of the calculations that led to a vast age for the Earth); the theory of uniformity, which

was also used to determine a vast age for the Earth; and the theory of a succession of life in a definite order all over the globe, which lent support to evolution as descent with modification through natural selection over vast periods of time. With respect to the theory of a succession of life, Price considered there was an unhealthy form of circular reasoning involved:

...geologists do not *prove* this succession of life, as most people suppose, but they *only assume* it as a working hypothesis. And it is unnecessary to show that this succession-of-life idea is only the skeleton of the evolution theory, and that to quote geology in favour of evolution is only reasoning in a circle.³²

Similarly, Price believed that geologists used circular reasoning when dating rocks: on some occasions rocks were used to date fossils and on other occasions fossils were used to date rocks so geology was “utterly incapable of any rational proof”.³³ This was why geology was sometimes labelled as ‘illogical’.

Price strove to present a geology based on what he called ‘inductive principles’. This was a geology devoid of *a priori* theories and based on facts obtained by observation and experiment. Interestingly, by the time Price had written his *New Geology*, he had come to realise that his presentation of the Mosaic Flood as the explanation of geological features on the Earth was indeed the presentation of an *hypothesis*. In the following quotation he classifies uniformitarianism as a *dogma*, a somewhat stronger term than *hypothesis* that was used for the Mosaic Flood:

Whatever may have been the form which this issue has assumed in the past, the issue in this third decade of the twentieth century is between a dogma, called uniformity, coupled with an assumption of a supernatural knowledge of the past, called the succession of life, on the one side; and the hypothesis of a world catastrophe having overtaken a splendid world fully stocked with plants and animals.³⁴

In due time it would be realised that science cannot exist without some form of hypothesis-making but this was not readily recognised until philosophers of science began to address this issue.

The Global Mosaic Flood

By the beginning of the twentieth century, when Price became active in writing his books and journal articles, the role given to the

Mosaic Flood as a causal agent in geological phenomena had almost disappeared from geological consideration. Much of what had been attributed to the biblical Flood was now attributed to the action of glaciers associated with the various ‘ice ages’ of the past. According to Warren Johns, the concept of an ice age became “the great nemesis of scriptural geology”³⁵ and Henry Howarth chose to refer to the ice age as a “glacial nightmare”³⁶ in the title of one of his books. The American scriptural geologist, Martyn Paine,³⁷ had previously labelled the introduction of the ice age theory as an intentional *invention* by professional geologists to do away with the Flood as a geological agent. Price³⁸ resonated with this idea, based on his reading of 2 Peter 3: 3–7, which labels the doubters of the word of God as ‘scoffers’ and reminds the reader that just as God previously destroyed the world with a Flood, so he will come again with fire to destroy the wicked. When harmonizing geologists began to accept the diminishing role of one catastrophic Flood as described in the Bible for understanding the Earth’s geology, Price expressed his concern in these words: “How sad to see such dodging and twisting on the part of the Bible’s professed defenders, instead of taking the record just as it reads, and assigning the great and striking geological changes to their most obvious cause, viz., the Noachian Deluge.”³⁹

Price was in the habit of poring over the writings of respected geologists to find information that would support his belief in a universal Flood. For example, he mined James Geikie’s *The Great Ice Age*⁴⁰ for useful problematic issues concerning evidence of glaciers over Europe and other parts of the globe. He concluded that it seems better and more sensible to substitute *water* for *ice* in the text and to simply believe that the so-called glacial deposits “were laid down at that universal churning up of the soil of the ancient world, the Noachian Deluge.”⁴¹ Price believed that all the fossiliferous deposits in the Earth’s crust were laid down at the time of the biblical Flood. He quotes a comment made by the leading palaeontologist and zoologist, Alleyne Nicholson,⁴² concerning the abundance of fossil whale bones in Alabama to suggest that the whales died in an unnatural way and that their bones were deposited during the final phase of the Flood. However, this was not an idea that Nicholson expressed at all in his book. Price was later to be criticised for, at times, suggesting that respected authors held his views on a particular topic.

On some occasions Price classified the ice age theory as *imaginary*. He was apparently unaware of the fact that the former geographical range of lions extended well beyond the tropics and when trying to reconcile the apparent past existence of tropical lions and hyenas in England with an ice age, he reflected:

How, then, could these animals have lived in these northern countries—for England has about the same latitude as Labrador—when the larger part of the North Temperate Zone is said by the geologists to have been covered with glaciers all the year round? The thing is almost too absurd for discussion. No, we have abundant evidence, from the fossils as well as from the Bible, that in those antediluvian days a nearly uniform climate of spring-like loveliness spread all over the earth...Certainly, with semi-tropical shell-fish in the seas, there is no room for their imaginary ice-sheets down to the sea-level in both Europe and America.⁴³

Price's determination not to shift from a biblical Flood position in spite of mounting evidence for the contribution of glacial action associated with great ice ages was to find support further in the mid-twentieth century with the publication of *The Genesis Flood* by Whitcomb and Morris.⁴⁴

The Geologic Column and Succession of Life

Price thought the geologic column was a phenomenal *scientific blunder*⁴⁵ belonging to a category he classified as "the last great stronghold of antibiblical science."⁴⁶ According to him, the time scale attached to the column was purely guesswork, as one could not determine whether an underlying stratum of rock was "laid down ten minutes earlier or ten million years earlier."⁴⁷ But Price considered that the strata themselves proved problematic for geologists. If the strata had been slowly laid down over millions of years, one would expect to see a gradual introduction of new species. However, the new species appear suddenly and Price claimed this evidence to be more in keeping with the Genesis Flood: "But these sudden appearances and disappearances are inevitable, and just what we would expect, if, as I have said, these formations do not represent ages, but are simply taxonomic classifications in the life-forms of a complete world that has disappeared from view."⁴⁸

Although these are not common, some places are now known where the geologic column does appear in a form similar to that displayed in

Figure 1, exhibiting an almost complete sequence of rock strata and fossils from Precambrian or Azoic through to Cenozoic with few, if any, missing strata. Perhaps understandably, Price was unaware of these. He certainly scorned the idea of putting different pieces of incomplete strata together to form the geological sequence shown in the column. Furthermore, and despite the fact that the major categories within the geologic column were established before Darwin published *Origins*, Price regarded the geologic column as an *invention* by geologists to support evolutionary thinking. He⁴⁹ informed the readers of the *Signs of the Times* that the column is only a “working hypothesis” based on some broad assumptions. It was difficult for Price realistically to assess how the column came to be constructed given that he had no field experience in geology. Professional geologists were not so much *inventing the column* for subtle anti-biblical purposes but rather were pragmatically recording the rocks and their characteristics as they observed them in the field. They documented gaps in the stratigraphy of rock formations, proved open to the possibility of different continental and oceanic configurations in prior times, and understood the fragmentary nature of the geological record. This is where the thinking of theoretical philosophers and practising field geologists differed substantially. Field experience inherently included the constant weighing up of hypotheses concerning many variables, as well as the three-dimensional relations of rock strata in different spatial settings, whether near or far. Without training and extensive practice in field mapping it becomes very difficult to understand and correctly critique the geologists’ thinking.

What catalysed Price’s objection to the geologic column was the existence of “upside-down” rock sequences in the Earth’s crust. He gave particular attention to Chief Mountain in Montana (Figure 2) where Pre-Cambrian rocks overlie soft Cretaceous shale, the opposite sequence to what one would expect from the geologic column (see Figure 1). Based on extensive periods of empirical field data collection over large distances, geologists concluded that there was evidence of an “overthrust” extending from Montana, through Glacier National Park, and into Alberta. This overthrust had pushed Pre-Cambrian rocks over the top of the Cretaceous strata. The fact that the overthrust extended for thousands of kilometres was unbelievable to Price who again concluded that overthrusts were an invention by geologists to protect their sacred geologic column. He states:

Solely on the strength of the infallibility of a theory invented a hundred years ago in a little corner of Western Europe, which ‘promulgated, as representing the world, a scheme collected from that province’, and assumed that over all the world the rocks must always follow the order there observed, we are here asked to deny the positive evidence of our senses BECAUSE these rocks do not follow this accepted order.⁵⁰

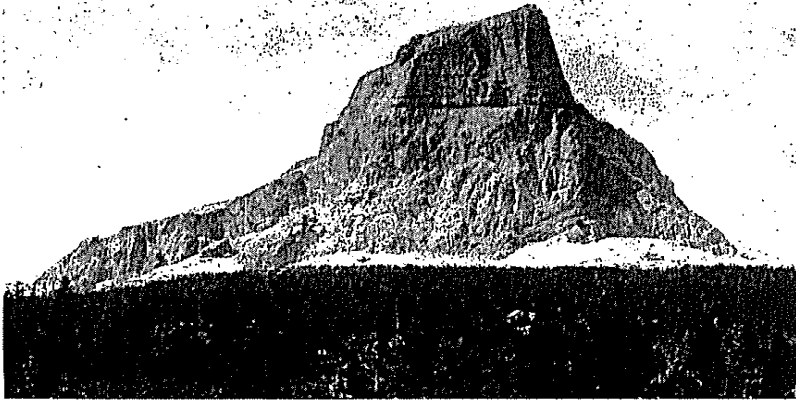


FIG. 429. Another view of Chief Mountain.

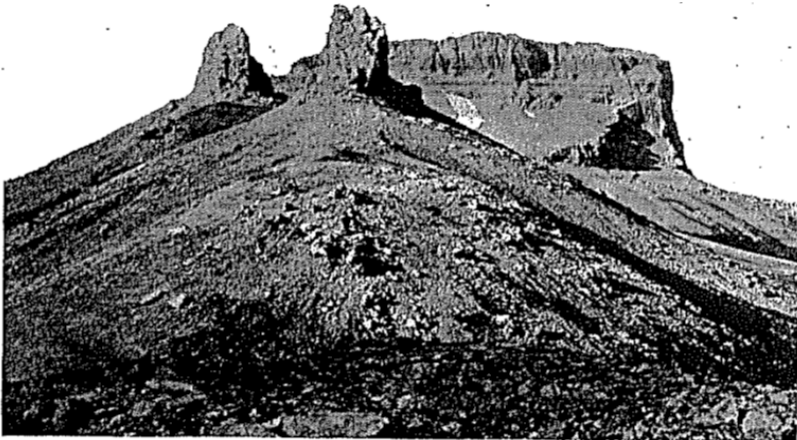


FIG. 433. Chief Mountain and its satellites. The pinnacles in the middle of the view are erosion remnants of Algonkian limestone resting on Cretaceous sandstone, the latter containing coal seams. All the upper part of the mountain proper is also composed of Algonkian rocks. The sloping part is Cretaceous. Glacier National Park, Montana. (Willis, U. S. G. S.)

Figure 2. Two views of Chief Mountain in Montana showing Pre-Cambrian limestone rocks sitting on top of Cretaceous shale and sandstone. The figures are taken from pages 627 and 631 of *The New Geology* by George McCready Price.

As far as Price was concerned, overthrusts were not rocks found in a sequence that had been reversed by large-scale structural processes,

but those found in a normal undisturbed position. Price wanted to show that all fossiliferous rocks were formed during the same catastrophic event and hence did not show chronostratigraphic ordering of fossils. So in some parts of the world one might see Cambrian rocks underneath Cretaceous rocks but in other parts of the world they could be in the reverse order, depending on how the Flood impacted that area. As far as Price was concerned, this was a more common sense explanation. Price would make highly selective use of the geological reports on the Montana–Alberta sequences to argue for the geologists’ *invention* of thrust faults to cover up occurrences of reversed-order fossils.

Reaction of Geologists to Price’s *New Geology* (1923)

In contrast to Price’s earlier publications, his *New Geology* contained some detailed geological content and photographs and was designed to be read as a geology textbook. Some of the geology content had appeared in his earlier publications but the detail was expanded in *New Geology*. Yale University Professor, Charles Schuchert, a leading palaeontologist and stratigrapher, called the book a “good-looking book, with excellent illustrations [which] gives a first impression of actually being an orthodox and high-grade textbook of geology... [but on closer examination is actually] a travesty [of] the real science of geology.”⁵¹ Arthur Miller, Professor of Geology and Zoology at the University of Kentucky, had, just prior to the publication of *The New Geology*, acrimoniously accused Price of “holding preposterous opinions [while being] a member of no scientific body and absolutely unknown in scientific circles, [who] has ... had the effrontery to style himself a ‘geologist’.”⁵² Miller was especially annoyed with Price because of his

... impugning the competency or integrity, or both, of the distinguished geologists who vouch for [the] existence [of the great thrust faults of the earth]: as that of Heim and Rothpletz for the great Glarus overthrust in the Alps; that of Geikie for the great overthrust in Scotland; that of McConnell, Campbell and Willis for the great overthrust along the eastern front of the Rockies in Canada and northwestern United States, and finally that of Hayes for the numerous overthrusts in the southern Appalachians.⁵³

The Reverend Father Stephen Richarz was a contemporary of Price and was professor of Geology at St. Mary’s Mission House in Techny, Illinois. He had a PhD in geology, had taught geology for several decades, and had contributed original research to accredited

geological journals. He was critical of Price's *The New Geology* and its staggering assertions such as:

There is no possible way to prove that the Cretaceous dinosaurs were not contemporary with the late Tertiary mammals; no evidence whatever that the trilobites [*Palaeozoic*] were not living in one part of the ocean at the very same time that the ammonites [*Mesozoic*] and the nummulites [*Cenozoic*] were living in other parts of the ocean; and no proof whatever that all these marine forms were not contemporary alike with the dinosaurs and mammals.⁵⁴

Like Miller before him, Richarz could not understand how Price could deny the work of “hundreds of serious and able scientists who devoted their whole life to the construction of the present palaeontological system of recording the sequence of fossils in geologic history.”⁵⁵ Richarz calmly exposed the fallacies of Price's argument with examples of overthrusts where proof for their existence “can be obtained [on the basis of their lithology alone] without regard to the fossils contained in the strata.”⁵⁶ According to Richarz, it is illegitimate to claim, as Price did, that such observed facts are simply a reconstruction by evolutionists to favour their theory. After examining Price's arguments for rejecting the whole concept of the “overthrust”, Richarz concluded:

There is not a single instance of fossils in the ‘wrong order’ which cannot be accounted for by overthrusts or overturned folds, and careful study in the field shows conclusively that such disturbances are, as a matter of fact, always the cause of the ‘wrong order’. It is [therefore] false to say that geologists postulate the great overthrusts in order to ‘explain away wrong sequences of fossils’... Mr Price can deceive only those who are strangers in the science of geology.⁵⁷

Over and above the geological concepts presented, Richarz was concerned with how Price often quoted well-known geologists out of context. He writes: “one single quotation seems to be favourable, but only because the decisive parts of the report of the geologist in question are left out.”⁵⁸

While professional geologists generally disagreed with many of Price's conclusions, his book was favourably received by those who were committed to a literal interpretation of the Genesis account of Creation and the Flood. This was particularly the case for those who were deeply concerned about the idea of theistic evolution.

One such individual was Catholic philosopher, Barry O'Toole, who wrote *The Case Against Evolution*, published in 1926. Although he had no geological expertise, O'Toole presented Price's arguments against professional geological stratigraphy in almost verbatim form. For example, he claimed that "we are no longer justified in regarding any fossils as intrinsically older than other fossils, and that our present classification of fossiliferous strata has a taxonomic, rather than a historical value."⁵⁹ Clark⁶⁰ reported that clergymen of many denominations were helped by Price in the strengthening of their faith in the literal record of Genesis. Numbers⁶¹ has shown how many of Price's ideas were to become foundational to the twentieth-century Creation Science movement, a movement built upon a literal interpretation of the Genesis record.

Adventist Contributions Subsequent to George McCready Price

From the 1940's the results of radioactive dating of rocks strengthened the geologists' position regarding millions of years for the geologic column and even extended the time into billions of years. This was to present an enormous challenge to orthodox Christians who adopted, after Ussher, a chronology that required an age for the earth of the order of 6,000 years. The challenge to Seventh-day Adventist belief, particularly for Adventist school teachers of biology and geology, led to the establishment of the Geoscience Research Institute (GRI) in 1958 by the General Conference. While Price's contribution to the science–faith issues was acknowledged, the criticism relating to his lack of formal training in geology and science in general was taken seriously by the church to the extent that it was determined to staff the GRI with well-qualified scientists who could understand the depth of the challenges facing the church. A list of the GRI directors and their scientific specialisation is given in Table 1. Staff qualified at doctoral level assisted each director in the work of the GRI, which included the organisation of field studies, publications, and curriculum materials for schools and colleges. The GRI was initially housed at Andrews University in Michigan but was re-located to Loma Linda University in 1980 when Ariel Roth took over as director.

Table 1 GRI Directors and their Scientific Specialisation.

Date of Appointment	Director	Specialisation
1958	Frank Marsh	Zoology and botany
1964	Richard Ritland	Comparative anatomy and palaeontology
1973	Robert Brown	Physics
1980	Ariel Roth	Zoology, coral reefs, radiation biology, geology
1994	Jim Gibson	Biology

As we have seen, Price largely determined the church's position on geology and the Flood for the first six decades of the twentieth century. For example, one can see his fingerprint in the 1953 publication of the Seventh-day Adventist Bible Commentary on Genesis. Frank Marsh, who had been one of Price's students and who was one of the scientists initially involved in the formation of the GRI, copied a whole section from Price's *New Geology* on the principles of stratification almost word for word in his book on *Evolution, Creation and Science*.⁶² Marsh also quoted in full four large paragraphs from Price's *New Geology* on creationism and uniformitarianism in his book *Studies in Creationism* ⁶³ because of "their accurate portrayal of the effect of the assumption of uniformity upon a science which should be of the greatest importance to us."⁶⁴

Price's hold on the science of geology and the Flood was to be broken by another of his students, Harold Clark (1891–1986), who studied under Price at Pacific Union College. In contrast to his mentor, Clark had acquired valuable field experience which partly led to his re-examination of some of Price's key positions on geology and the Flood. However, Clark remained committed to Price's Flood Geology as a "universal catastrophe occurring, according to biblical chronology, not many hundred years before the beginning of written history,"⁶⁵ Clark mentioned that "during the years a few revisions were found necessary."⁶⁶ The revisions are summarised in Table 2.

Table 2 Clark's Revision of Price's Key Ideas Related to Geology and the Flood.

Price's key ideas	Clark's revision
Proposal of Ice Ages and their associated glacial action is an <i>invention</i> by geologists to discredit the biblical record supporting the action of water.	The data regarding glacial action have strong support and can be fitted into the Flood theory.
The geologic column purporting to show a regularity of stratified rock types and succession of life forms is an <i>invention</i> by geologists to support the theory of evolution.	There is much more regularity to the stratified rocks than Price had recognised. The results of extended studies in mining geology suggest that by the middle of the century the validity of the sequence of rock formations had become established beyond any serious question.
The idea of 'overthrusts' is an <i>invention</i> by geologists to explain away the upside-down strata of rocks.	There is clear evidence for extensive lateral movements known as 'overthrusts' — a point which had hitherto not been recognised by diluvialists.
All fossiliferous strata were formed as a result of the global Mosaic Flood.	The proposition that some Tertiary rocks may have been produced after the Flood seems to have some merit. Studies on Lower Paleozoic rocks seem to indicate that some reefs may well have had their origin in the deep seas before the Flood, and this seems quite acceptable also.

Gary Land⁶⁷ has revealed that when Price discovered that Clark was a supporter of the idea of the geologic column he accused him of heresy and tried, without success, to have him condemned by a meeting of ministers. What seems to have convinced Clark of the legitimacy of the column was the observation that in some places practically the whole geological sequence could be seen at once. The example of the canyons of the Wind River Mountains in Wyoming is given in this respect⁶⁸. This was in contrast to many areas where only two or three periods could be found in order in one locality.

Clark re-examined the features around Chief Mountain that Price had written up in his *New Geology* as an example of upside-down rock strata. This is where Algonkian limestone of Pre-Cambrian origin sits on top of Cretaceous shale. In other parts of the countryside the shale sits above the limestone which is what one would expect from the geologic column. Where the Cretaceous shale is sitting underneath the Pre-Cambrian limestone, it is intimately contorted, crumpled and broken. Clark concluded that, "There is every evidence that astoundingly great forces have been at work."⁶⁹ Price had claimed that the limestone had been laid down on top of the shale naturally but extensive examination over large distances had revealed evidence of tectonic forces of large magnitude which had pushed the limestone up and over the shale. An example of an overthrust is shown in Figure 3. Clark considers these forces to have been associated with the Flood event as follows: "But anyone who has spent any time in the field will be convinced of the fact that stupendous distortional effects must have accompanied the closing paroxysms of the Flood."⁷⁰ So the geologic column survived the accusation of 'invention'.

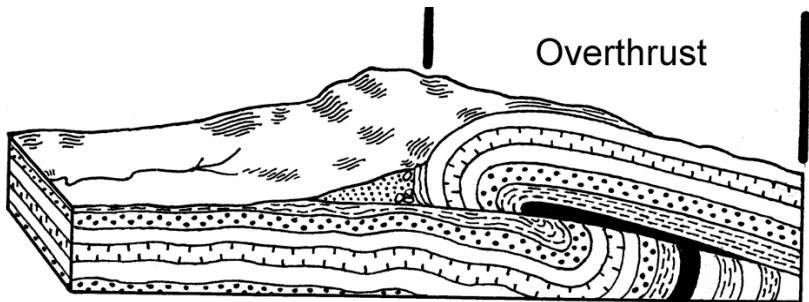


Figure 3. An example of an overthrust where a change in stratification occurs as a result of tectonic forces of great magnitude.

Contemporaries of Clark such as Harold Coffin, who worked for the GRI, also agreed that one need not assign all fossiliferous strata to the Flood: “Certainly, however, the deposition of all sedimentary strata cannot be assigned to one event ...”⁷¹ In discussing the evidence for abundant underwater activity on the continents, Ariel Roth explained how the lower half of the fossil record reveals a current flow direction toward the southwest in North and South America; the flow direction changes toward the east as one ascends the geologic column; and near the top of the column there is no dominant direction of current flow evident. Roth explained the trend as follows: “We can explain this later lack of direction as either the draining of the continents at the end of the Flood or post-Flood activity, such as occurs today.”⁷² When discussing some of the issues associated with *Short-Age Geology*, Leonard Brand claimed that “a significant part of the Cenozoic fossil record, probably formed after the global catastrophe, includes evolutionary sequences of organisms within the individual created groups.”⁷³

Clark was always adamant that even though important revisions to one’s understanding of geological processes needed to be made, this in no way diminished his belief in a recent global Flood catastrophe as recorded in the Bible. In fact, the church through the GRI maintains this position currently, even though there is no fundamental belief which focuses specifically on the Mosaic Flood (compare with Fundamental Belief 6 for Creation); however, it is mentioned in Fundamental Belief 8 in relation to the Great Controversy: “This human sin resulted in the distortion of the image of God in humanity, the disordering of the created world, and its eventual devastation at the time of the global Flood, as presented in the historical account of Genesis 1–11.”⁷⁴

How, we might ask, could a recent global Flood catastrophe be accommodated with the geologic column that spans a period of millions of years? This is to be addressed briefly in what follows.

Short-Age Models of a Global Flood and the Geologic Column

When Clark recognised that the geologic column was not a clever ‘invention’ on the part of geologists to discredit creationism, he realised that he needed a short-age model that could explain the order of creatures represented there. Thus was born his “ecological zonation” model.

Ecological Zonation Model

This model is an attempt to explain how the fossils in the geologic column were deposited in the order in which they now appear. Different animals lived in different ecological zones ranging from the sea, to the lowlands, to the midlands, and finally the highlands. As ocean waves began to impact the land and form sediments, marine creatures living at the bottom of the sea would be buried first. Next would come bottom-dwelling fish, followed by amphibians and reptiles that resided on the shoreline. Then, in their turn, the dinosaurs and other reptiles of the midlands would be buried, and finally, at higher altitudes, the birds and mammals. In Clark's view, these burials in sedimentary deposits happened very rapidly over a relatively short period of time. He recognised that the "ecological zonation theory does not pretend to give an absolutely true picture of the relative positions of all life forms in their original places. But it does propose that what sequence there is, is due to the successive burial at the time of the Noachian Flood of ancient life zones or habitats, together with the contemporaneous life that lived with them. With the geologic column formed in this way there was no need to look to a succession of life formed throughout long ages of time."⁷⁵

On examining this model Brand noted that pre-Flood ecology would have had to be different from that observed today in order to be consistent with the fossil record. In addition, he observed, "If much of the Cenozoic was deposited post-Flood, then ecological zonation is not relevant to the order of fossils in that part of the Column, and it requires some other explanation."⁷⁶ His assessment of the model is worth noting: "Our current understanding of this hypothesis leaves many unanswered questions. It is difficult to see how it could explain much of the evidence. Ecological zonation was a useful concept to begin with in short-age theorizing, but reality is likely to be much more complex than was originally envisioned."⁷⁷

Traditional Flood Geology

This model contains some, but not all, of Price's ideas. Major geological activity such as mountain building, erosion, volcanoes and earthquakes is confined to the Flood and post-Flood periods so that the period from Creation to the Flood was not geologically active. The majority of the fossil record, the Phanerozoic eon of the geological column, was formed as a result of the Flood. The Cambrian organisms

were the first to be killed, buried, and fossilized and then the Paleozoic and Mesozoic fossils were formed within about a year of the onset of the great catastrophe. The ecological zonation model is often used to describe the order of burial and fossilisation. Some proponents of this model suggest that most of the Cenozoic deposits were formed during the Flood but others take the view that most of the Cenozoic is post-Flood.

A number of problems exist. Many of the Paleozoic and Mesozoic fossil distributions currently found are difficult to interpret if there has been no relative continental movement since they were deposited. However, they are elegantly explained on the basis of continental drift, based on the theory of plate tectonics. This view is strongly supported by the shape of the continents and such features as ocean-floor spreading. If the Paleozoic and Mesozoic fossils were indeed formed within the period of the Flood or shortly after, then in contrast to the current continental movement rate of 1–4 centimetres per year, huge drift speeds would be required in order for the continents to reach their current positions and show the fossil distributions now observed. A related question to which no satisfactory answer has yet been proposed is how the heat generated by this rapid movement was removed or absorbed. Another issue facing traditional Flood geology involves coral reefs. These are spread throughout the fossil record. Since each stratigraphic level of coral reef requires up to hundreds of years to grow, it seems impossible for these fossils to have formed within a year of the Flood.

Alternative Flood Geology

This model starts from the premise that it is not known which part of the geologic column represents Flood deposits. The model allows for the possibility of pre-Flood geological activity in the oceans and lowland areas near the oceans since the Paleozoic is mostly marine in origin. It allows for the Cenozoic to be mostly, if not all, post-Flood. Like the traditional model, it recognises that great geological activity occurred not only during the Flood but in its aftermath. One of the problems faced by all short-age models is the evidence from ice cores taken in both the Arctic and Antarctic that shows tens of thousands of laminations which are interpreted as annual deposits, suggesting times in excess of tens of thousands of years for their formation. Brand highlights this problem of ice cores as follows: “At present it is

not evident how these can fit into any approach to short-age geology. Careful research is needed on the details of these laminations and the assumptions that underlie their interpretation. Could these represent one layer per storm instead of one layer per year?"⁷⁸

Comparing Short-Age models with Conventional Geology

A visual comparison of the two short-age models and the conventional geology model is given in Figure 4 (after Leonard Brand, Professor of Biology and Palaeontology at Loma Linda University⁷⁹). It should be remembered that conventional geology now recognises the importance of catastrophic events in the earth's history but when these are apportioned across millions of years they tend to appear as blips on the landscape, as shown in (C) of Figure 4. While the Phanerozoic geological record and the fossil-bearing deposits of the geologic column, formed over thousands of years in (A) and (B), a time period of 542 million years is ascribed to (C). Some short-age geologists allow for a conventional geological time for the Pre-Cambrian rocks but suggest that the radioactive time clocks associated with the Phanerozoic are relative times rather than absolute times. Why the Pre-Cambrian is allowed to register absolute ages but the Phanerozoic relative ages is a significant question that needs further exploration. After discussing the issue of radiometric time data, Brand concluded that "the radiometric time scale is the most significant challenge to short-age geology."⁸⁰ While short-age geologists are still researching the issue of time, the current conclusion, according to Brand is that, "belief in a short-age geological model is still based mostly on faith in the Bible account as accurate history."⁸¹

Brand is a rather unique Adventist author in this area in that his work tends to be less apologetic and more even-handed in his treatment of conventional geology and short-age geology even though he states his bias towards short-age geology, including a global Flood. In his *Faith, Reason, and Earth History* for example, he lists ten evidences favouring conventional geology and megaevolution alongside ten evidences favouring short-age geology.⁸² These are shown in Table 3.

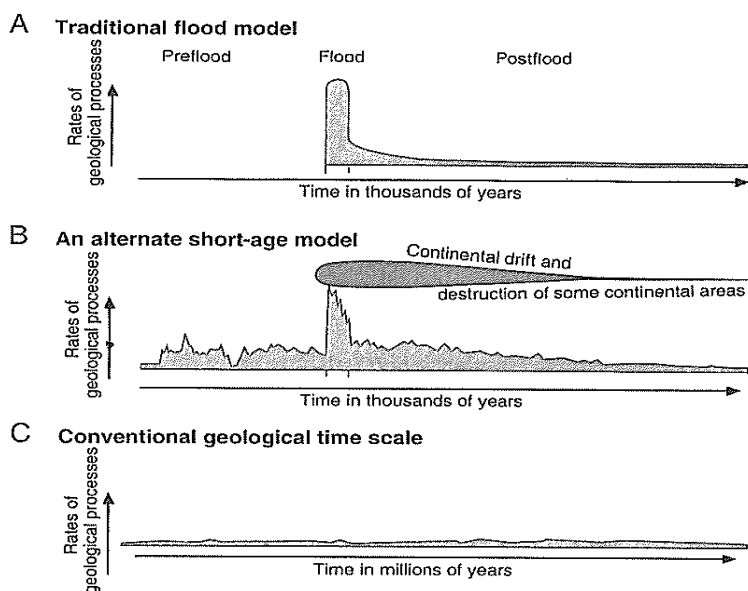


Figure 4. Comparison of theorized rates of geological processes in three models of geological history. (A) Most geological activity in the one-year Flood. (B) The geologic column accumulates before, during, and after the Flood. (C) Conventional geology with the geologic column accumulating over many millions of years. (Used with permission from Pacific Press and L. Brand—appeared first in *Beginnings* 2005).

Table 3 A tentative list of ten evidences favouring short-age geology alongside a list of ten evidences favouring conventional geology, Brand (2009).

Evidence Favouring Intervention and/or Short-Age Geology	Evidence favouring Megaevolution and Conventional Geology
Lack of fossil intermediates	Some Biogeography
The problem of originating new body plans	Sequence of vertebrate fossils
The problem of originating life	Precise sorting of fossils in the fossil record
Sedimentation rates	Reptile/mammal fossil intermediates

Megabreccias (the larger clasts)	Time required for cooling of laccoliths
Small amount of sediment in the oceans	Glaciation (some of the evidence)
Gaps in the geological record with little or no erosion	Fossil reefs (some)
Rate of erosion of the continents	Stromatolites requiring growth time
Very widespread sedimentary formations	Tidal cycles in sediments
Extensive bedded sediments	Radiometric dating

Note: Megabreccias are sedimentary deposits in which angular rocks called clasts greater than one metre in diameter occur in a matrix of finer material and smaller rocks. Biogeography includes a study of how animal groups distribute themselves across a landmass. A laccolith is a blister-like intrusion of magma through one sedimentary layer pushing up a second sedimentary layer without breaking the surface. Stromatolites are mound-like structures formed by cyanobacteria that begin to grow on rocks or other objects and then form layer after layer as sediment collects on the sticky cyanobacteria. It takes several years to grow an average size stromatolite.

One could argue that Brand is mistaken to entertain the idea of ‘intervention’ in science, which relies on methodological naturalism. That is, science is usually seen to operate outside the realm of divine intervention as it encounters natural processes and natural law. Brand justifies his position as follows: “Most scientists would object to considering supernatural causes in geology. Yet the real question is not whether we like it, but whether it happened. If it did happen, it is possible that some evidence of that unique occurrence would be left in the rocks, and we should eventually be able to find that evidence.”⁸³ A challenging question for Seventh-day Adventists in relation to Table 3 is the following: where is the weight of evidence strongest; on the right side or left side of the table? There appear to have been two broad responses to this question.

Some, like Brand, favour short-age geology primarily because of their fundamental commitment to a belief in the historical reality of the Creation and Flood narratives of Genesis and the metanarrative given by Ellen White on Creation and the Flood. This is also combined with

some scientific evidence that some geological processes must have operated over shorter times than allowed in the conventional model. However, there is a recognition that the major sticking point for short-age geology is the evidence of long ages suggested by radiometric dating. So scientists like Brand encourage other Adventist scientists to focus on doing fundamental research into dating methods, such as radiometric techniques, in order to resolve the issues faced by short-age geologists:

The trend toward more catastrophic processes [in geology] is a movement in the direction predicted by short-age theory. The field of geology will be benefited if more earth scientists actively use the short-age theory in proposing and testing hypotheses about radiometric dating and geologic history, as long as they use careful scientific methodology and benefit from scientific peer review. The excitement of discovery awaits those who are willing to break new ground in research and look at familiar things from a new point of view. But this viewpoint will still need to account for the radiometric age data, not ignore that data.⁸⁴

Brand is reasonably confident that progress will be made in this area of investigation:

Some of us predict that we will discover more reasons why radiometric dating, at least in the Phanerozoic, does not give correct times in years. It is only a relative scale of isotope ratios produced by some factor other than time and associated with geological events occurring in a much shorter period of real time. This factor will be a significant process that affects all radiometric processes and will not involve separate “fixes” for each dating method.⁸⁵

Others, when looking at the evidence in Table 3, are persuaded that the weight of evidence is firmly on the side of conventional geology and biological evolution. They find, as practising scientists, the evidence on the right side of Table 3 so profoundly convincing that to deny the overall legitimacy of the evidence would be to deny their profession. The big sticking point for a Seventh-day Adventist in this category is the issue of scriptural interpretation and the legitimacy of the writings of Ellen White in this field. So the focus of research amongst members in this group is biblical studies, theology, and Adventist History. This is not to suggest that scientific research is not important for this group and biblical research is not important for the first group. But it is where the sticking points lie for each group.

In addition to the differences recorded in Table 3, there are positions that receive support from both short-age geology and conventional geology, such as evidence for water covering more of the continents in the past. The task of a geologist to provide convincing models for Earth behaviour is challenging given the complex nature of the earth's crust and the geological processes associated with it. As Coffin explains, there is often not just one tight explanation for a geological phenomenon: "It is difficult to say definitely in many instances, 'This was caused by the Genesis Flood'. There is usually more than one possible interpretation of geological and paleontological phenomena."⁸⁶ But what evidences have been provided by Adventist scientists for a global Flood? This is the topic that follows.

Evidences Provided by Some Adventist Scientists for a Global Flood

In this section consideration is given to evidences published by Adventist authors from 1953 (when the first SDA Bible Commentary was published) to 2012 (when Ariel Roth contributed a chapter on the Flood in the compilation, *In the Beginning: Science and Scripture Confirm Creation*, edited by Bryan Ball). Ariel Roth has been particularly prominent as a writer on this topic. The major contributors to the chapter on geology attached to the commentary on Genesis in 1953 were George McCready Price and Frank Lewis Marsh. Did the evidences change over this time period and if so, what may have brought about the change? The details are provided in Table 4.

Table 4 Evidences for a Global Flood Published by Adventist Authors.

Author and Year	Publication	Evidences
George McCready Price and Frank Lewis Marsh: 1953	<i>SDA Bible Commentary</i> Volume 1, Review & Herald	1. The old shore lines 2. The interior basins 3. Arctic ice mummies 4. Bone-filled fissures 5. Great rubble heaps

Harold G. Coffin: 1969	<i>Creation-Accident or Design, Review & Herald</i>	1. Great sedimentary deposits 2. Delicate preservation of fossils and body parts 3. Characteristics of coal deposits
Robert H. Brown, Harold W. Clark, Harold G. Coffin, Harold E. James, Edward N. Lugenbeal Ariel A. Roth: 1978	<i>SDA Bible Commentary</i> (3 rd edition) Volume 1, Review & Herald	1. Marine sediment distribution 2. Widespread sedimentary deposits 3. Reduced provinciality in fossil record 4. Turbidites 5. Paucity of erosional features at unconformities
Ariel A. Roth: 1998	<i>Origins—Linking Science and Scripture, Review & Herald</i>	1. Abundant underwater activity on the continents 2. Widespread sedimentary deposits 3. Incomplete ecosystems 4. Time gaps in the sedimentary layers
Ariel A. Roth: 2011	<i>Understanding Creation</i> , L.J. Gibson & H.M. Rasi (eds.), Pacific Press	1. Ocean sediments on continents 2. Abundant underwater activity on continents 3. Continental-scale currents 4. Widespread sedimentary deposits 5. Flat gaps in sedimentary layers 6. Incomplete ecological systems 7. Unusual coal deposits

Ariel A. Roth: 2012	<i>In the Beginning: Science and Scripture Confirm Creation</i> , B. Ball (ed.), Pacific Press	1. Widespread sedimentary deposits 2. Widespread fossil distribution 3. Abundant underwater activity on continents 4. Abundant ocean sediments on continents 5. Evidence of continental-scale currents 6. Survival of ancient surfaces 7. Paraconformities—flat gaps in sedimentary layers 8. Incomplete ecological systems
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It can be seen from Table 4 that the Old Shore lines advanced by Price and Marsh as evidence for a global Flood are no longer (since 1969) accepted as evidence. The change is due to the emergence of strong evidence for an ice age during the Pleistocene. As Brand explains:

During and after glaciation, large lakes developed in western North America ... The shorelines of these Pleistocene lakes can be seen in the desert basins in Nevada, and especially in Utah along the Wasatch Mountains from Salt Lake City south to Provo and beyond. Interventionists sometimes cite these old shorelines as evidence of the receding waters of the flood. But the flood waters certainly must have been gone before glaciation, and these shorelines are from the receding of the glacial waters.⁸⁷

Gone also is the evidence of the preservation of fossils by rapid burial. Since conventional geology now recognises the importance of catastrophism in interpreting geological phenomena, this is no longer used as evidence of a global Flood. Roth alerts us to the problem this way:

Some of the evidences for the flood that creationists once used are no longer as pertinent, because they have been incorporated into neocatastrophism. For instance, creationists have sometimes cited

the usually well-preserved quality of many fossils over the world as evidence of the rapid burial that we would expect from the deluge. However, because both creationists and non-creationists can now incorporate rapid burial into their catastrophic repertoires, the good preservation of fossils no longer serves as a valuable distinguishing feature between the two models.⁸⁸

Two additions to the list of evidences made since 1978 are worth mentioning and both appear in the lists created by Ariel Roth. The idea of incomplete ecosystems was introduced in Roth's 1998 list. The fossil record is rich in the remains of animals but very devoid of plant remains. Roth⁸⁹ mentions the Morrison Formation in the western USA which is one of the richest sources of dinosaur fossils, yet the evidence for plant remains is very meagre. The question arises: how did such a large variety of dinosaurs survive the so-called millions of years required to produce the Morrison Formation? Roth⁹⁰ suggests that the Formation might have been a Flood-created burial ground for dinosaurs with plants having been sorted and transported elsewhere. The other addition of note is the one made by Roth in 2012 in regard to the survival of ancient surfaces. Roth⁹¹ takes Kangaroo Island off the south coast of the Australian mainland as an example and claims that the island's surface should have experienced five kilometres of vertical erosion over the scientifically accepted lifetime of millions of years. He claims that scant evidence of such erosion suggests a timescale more in keeping with a recent Creation and Flood. Readers interested in a detailed account of the geology of Kangaroo Island should consult a recent publication of the University of Adelaide Press.⁹²

Given the complexity of the issues shown in Tables 3 and 4 for example, how has geology as a science fared under the scrutiny of Adventist theologians and the sceptical eyes of other scientists within the Church when it has questioned the legitimacy of a global Flood? This question is examined in what follows.

The Survival of Geology as a Science within Adventism

Given that Ellen White described geology with terms such as 'infidel geology' and George McCready Price was to title one of his books, "Illogical Geology", it is surprising that geology as a discipline of study has survived within Adventism. Price's criticism of the use of hypotheses, guesses, theories, hunches and the like in geology

have to be understood from the point of view of a long tradition in the history and philosophy of science. Exactly the same kind of criticisms were levelled at physics during its development in the 17th century and at chemistry in the 18th century. The two chemists, Joseph Priestley (1733–1804) and Antoine Lavoisier (1743–1794), set out to accomplish their chemistry simply through the facts of observation and experiment without recourse to hypotheses and theories. But Priestley could only understand his chemistry through the lens of the *phlogiston* theory and Lavoisier through the *caloric* theory⁹³. Thus hypotheses and theories became fundamental to scientific progress. Adventist scientists now realise this. In describing the work of scientists, Brand declares that “Scientists, in the process of discovery, formulate hypotheses or theories, collect data, conduct experiments to test theories, and develop generalisations called scientific laws.”⁹⁴ What distinguishes geology, classified as an historical science, from physics and chemistry, classified as experimental sciences, is the significant presence of multiple hypotheses in geology. This arises particularly from its complex nature. Concepts in physics and chemistry are more easily testable by experiment and Price was wanting a geology that was similarly testable. This was why he dedicated one of his books to Newton.

Adventist authors no longer classify geology as an illogical science. But they do focus on the tentativeness of its theories or working models and the limitations of its method. These two ideas featured in the work of philosophers of science like Thomas Kuhn⁹⁵ and Paul Feyerabend⁹⁶ from about the mid-1960s, and Adventist authors now invariably seek their support for highlighting scientific ideas as tentative and scientific practice as limiting. It is true that some scientists have overstated the objectivity of their discipline and have needed the correction of philosophers. The Nobel Prize winner in physics, Steven Weinberg, conceptualised progress in science in the following terms: “What drives us onward in the work of science is precisely the sense that there are truths out there to be discovered, truths that once discovered will form a permanent part of human knowledge.”⁹⁷ Philosopher of science, Ronald Giere, saw things differently:

Weinberg should not need reminding that, at the end of the nineteenth century, physicists were as justified as they could possibly be in thinking that classical mechanics was objectively true. That

confidence was shattered by the eventual success of relativity theory and quantum mechanics a generation later.⁹⁸

In contrast to Weinberg's *objectivist realism* program in science, Giere adopts what he calls a *perspectival realism* which recognizes that scientists are engaging with the real world as we know it when they propose models, theories and laws but these entities are not the final word or what might be called the ultimate truth. They are very much part of the human enterprise. There is a danger of course in overemphasizing the tentative nature of scientific ideas with the result that we completely ignore what we can learn from the results of investigations of good practitioners of science.

Some Challenging Ideas from Biblical Studies and Archaeology

From a detailed study of Genesis 6–9, Warren Johns⁹⁹ proposed that a belief in traditional Flood geology can no longer be sustained. By traditional Flood geology he means a model that postulates that the majority of the fossil record was produced by the Noachian Flood; that representatives of all living creatures went into the Ark; that the major source of the Flood waters was the antediluvian oceans; that modern mountain chains are a product of the Flood; and that the Flood covered the entire globe. Meanwhile, Johns maintains that “a short chronology is not dependent on the success of Flood geology as an explanatory paradigm for earth history.”¹⁰⁰

There is no space here to detail the biblical exegesis Johns gives of the Genesis text but the outcomes of his study are as follows:

1. The floodwaters could not have covered all the land portion of the Earth at one time.
2. The animals preserved in the ark were those closely associated with human activities.
3. The mountains were not a product of the Flood but were relatively stable during the Flood.
4. The oceans were not used to provide the water of the Flood. Biblical evidence suggests it was most likely potable fresh water from underground fountains. The marine deposits found on land are due to inundation of seawater at a time other than the Flood.

5. The Noachian Flood most likely involved ‘valley floods’ that could have been widely scattered. The Flood was designed predominantly to destroy places where immorality was pervasive.
6. The purpose of the Flood was to rid the world of moral pollution and the Flood account can be regarded as a theological polemic against Canaanite-style fertility practices and worship.

The current consensus amongst archaeologists regarding the Noachian Flood has been discussed by Lawrence Geraty¹⁰¹. He referred to the following statement by Jack Lewis: “Scholars are agreed that archaeological evidence for a universal Flood in the historical past is wanting. The silt layers noticed at Ur and Kish by Woolley and Langdon ... are of differing dates, and lack convincing connection with the biblical narrative. Extremely old sites in Palestine, such as Jericho, have revealed no flood deposits..”¹⁰² However, there appears to be some archaeological evidence for a localised flood in the region of the Black Sea. Apparently the Black Sea was originally a freshwater lake caused by the melting of glacial ice. Evidence suggests that sometime after the lake formed there was an inundation of sea water from the rising Mediterranean or the collapse of a land ridge in what is now the Bosphorus Strait. Geraty concluded: “The bottom line is that we might have our best ‘archaeological evidence’ yet of a widespread and devastating ‘local’ flood that could have given rise to Noah’s experience recorded in Genesis.”¹⁰³ Geraty also examined some of the similarities and differences between the flood stories of the ancient Near East and the account of the Flood in Genesis and suggested that “the Genesis Flood story is a conscious reaction to its contemporary Babylonian flood story.”¹⁰⁴

The Emergence of Two Broad Viewpoints within Seventh-day Adventism

Two broad viewpoints about geology and the Flood emerged within Christendom during the 19th century. These viewpoints were represented by *harmonising geologists* and *scriptural geologists*. The *harmonising geologists* tended to be practising geologists who were Christians and who interpreted scripture in such a way that it harmonised with the findings of contemporary geology. So, as alluded to earlier, each day of creation was taken to represent millions of years.

The Flood was understood to have covered only that part of the Earth known to Noah. These are just two examples. For their part, *scriptural geologists* were largely not practising geologists but interpreted geology in such a way that it correlated with a literal historical reading of Genesis. There are similarities but also some differences between these two viewpoints and the two positions that have emerged within Seventh-day Adventism. I am still struggling to think of the best way of classifying these latter two viewpoints but for now I will call them Viewpoint A and Viewpoint B.

To some extent Viewpoints A and B arose as different reactions to data such as that described in Table 3 but the differences run deeper than this. I have tried to detail some of the similarities and differences in Table 5, noting that this is a work in progress. Both viewpoints seek to be progressive and conservative in different ways so the conservative and progressive label doesn't really fit. Table 5 is my first attempt at classification.

One can see from Table 5 that the issue of scriptural authority is one that seems to distinguish the two viewpoints at a fundamental level. The primacy of scripture and *Sola Scriptura* are seen as worthy remnants of the Protestant Reformation. It is not surprising that Seventh-day Adventism, a movement committed to furthering the Protestant Reformation, would embrace such noble aims for scripture. Bryan Ball has a deep respect for science but embraces the primacy of scripture over science in these words: "But it does mean that the biblical text has primacy, that divine revelation as the principal source of truth takes precedence over mere human considerations and over interpretation of the data that is found in nature."¹⁰⁵

Table 5 Characteristics of Viewpoints A and B emerging within Seventh-day Adventism in relation to geology and the Flood.

Viewpoint A	Viewpoint B
High regard for both scripture and geology as a science	High regard for both scripture and geology as a science
Scripture has prime authority over science	Scripture and science share authority
Emphasis on the literal, historical reading of scripture	Emphasis on the spiritual, theological reading of scripture

Challenges the geological community to seriously include a short-age model for understanding earth history including any evidence of Flood deposits	Challenges the biblical studies and theological community to determine how the Hebrew people would have initially understood the narrative of the Flood
Most consider the Genesis Flood to have been a universal phenomenon	Most consider the Genesis Flood to have probably been a localised phenomenon
Consider the Phanerozoic deposits of the geologic column to have been laid down over thousands of years	Consider the Phanerozoic deposits of the geologic column to have been laid down over millions of years
Denies the possibility that organisms could have evolved from simple forms to more complex forms	Accepts the possibility that organisms could have evolved from simple forms to more complex forms

But some have issued a warning in this regard. According to Fritz Guy:

... the Reformation motto *Sola Scriptura*, ‘by scripture alone’, popularly interpreted as ‘the Bible and the Bible only’, has always been a polemical exaggeration. It was originally intended to oppose the Roman Catholic emphasis on the authority of ecclesiastical tradition for the proper interpretation of scripture, but more recently it has often been used to avoid questions that secular knowledge raises for traditional interpretations of faith.¹⁰⁶

By secular knowledge Guy includes scientific knowledge and the challenges it raises for faith. When scripture and nature are both equally regarded as God’s revelation, one the revelation of God’s character and the other the revelation of God’s creation, then both revelations demand equal respect. Advances in philosophy of science and philosophy of religion show us that it is impossible simply to read scripture and nature without an *interpretation* of what is before our eyes, whether it be through biblical studies and theology or through science. It is when we try to correlate the interpretations that difficulties can arise for us. Bull and Guy described the situation this way:

So we typically do place unrealistic scientific demands on an ancient text whose authors had no such thing in mind ... This is why many serious Christians say things like “I don’t interpret the text; I just read it,” and, “Our faith controls our science; our science does not control our faith”. Those who say (or even think) these things fail to realize that every reading *is* an interpretation, and that their own interpretation is that of a modern, scientific mind whose understanding of science inevitably *influences* (although it need not *control*) its understanding of faith.¹⁰⁷

This is why Viewpoint B differs from the 19th-century harmonising geologists; it seeks to allow the ancient text, including the narrative of the Flood, to stand on its own without any imposition of any scientific demands as much as lies within one’s control. It also allows the scientific text, including the geologic column with its challenges, to stand on its own without any imposition of scriptural demands. It is in this context that a constructive dialogue between theologians and scientists can take place. Understanding the differences between the text of scripture and the text of nature and science is critical for this dialogue. Guy described the differences this way:

Although scripture is properly regarded as “historical revelation”, its principal concern is not bare historical *facts* as such but the *meaning* of the events which it narrates. Thus scripture provides not primarily a factual chronicle but a theology of history. Its authors were not nineteenth-century positivist historians dedicated to finding out “what really happened”. Scientific historical description and analysis are certainly legitimate concerns, but they are not the concern of the scriptural authors.¹⁰⁸

Adventists adhering to Viewpoint A are uncomfortable with this understanding of scripture and believe that scripture can inform a scientific understanding of our world even though there is agreement that scripture is not a scientific textbook. It is firmly believed that when scripture speaks of matters that are also of concern to science such as the impact of a Flood on human life and Earth processes, it always takes primacy over science when the message of scripture and science differ. This appears to be the position of Leonard Brand of Loma Linda University. After detailing the success that naturalistic science has provided humankind in explaining Earth history and the history of life, Brand threw down this challenge:

... some believe that although major portions of that standard scientific paradigm are on the right track, other significant aspects are not. Those of us who are of that persuasion are convinced that, if we allow our Christian worldview to open our minds to new ideas and testable hypotheses suggested by the biblical story of origins [and of the Flood], this approach ultimately will lead to a more successful explanation for the history of life and of the earth.¹⁰⁹

Those holding viewpoint B are not quite as optimistic, given the continuing success of methodological naturalism. These successes are acknowledged by Brand. After proposing that a science practised under a biblical interventionist worldview will eventually provide a more coherent explanation of Earth's history he identified three major hurdles that research within his worldview will need to address. These were: the apparent time scale for the Phanerozoic portion of the geologic column; evidence for the development of life by natural processes without informed intervention; and the evidence for the mega-evolution of new life forms. Since the focus of this chapter is geology and the Flood we will not have the space to deal with the origin of life and evolution. Suffice it to say that one of the major driving forces behind Adventist research in this area, including the Genesis Flood, since the latter part of the 19th century has been, in the eyes of some, the tendency of some aspects of Viewpoint B to lead to a belief in theistic evolution although this is not necessarily the case. A discussion of theistic evolution is beyond the scope of this chapter.

I think it is fair to say that Viewpoint A is currently the dominant orientation within Seventh-day Adventism but voices promoting Viewpoint B are becoming more audible. What is the best and most constructive way forward for the church? Both viewpoints have ardent supporters. Unfortunately the wider Christian church has not had a positive history in dealing with diversity within its community. Brand reminds us that "none of us, no matter what philosophy we start from, is in a position to make dogmatic scientific statements about somebody else's point of view on the subject. Ridiculing someone who also is searching honestly for understanding is never constructive."¹¹⁰ What would prove destructive to the church would be to make a particular viewpoint a test of faith or a test of orthodoxy. It would seem that if goodwill prevails, allowing both viewpoints to coexist in constructive dialogue might be the best approach.

Conclusion

In this chapter I have endeavoured to trace the developments in Seventh-day Adventist understanding of the Genesis Flood from the beginning of the 20th century through to the beginning of the 21st century. It is impossible to discuss the Flood without discussing earth science as well, so a study of relevant geological concepts has also been featured. George McCready Price was the dominant voice in Adventism for over fifty years but this changed as Adventist scientists gathered field experience and advanced qualifications in the biological, earth, chemical, and physical sciences. Price questioned the very nature of geology as a science but by the 1960s, after the establishment of the Geoscience Research Institute geology became more acceptable as a scientific discipline within the church.

While the dominant view of the Genesis Flood has been that it was a global phenomenon differences of opinion exist as to what parts of the geologic column were deposited by it. The universality of the Flood has also been questioned from within the church, with the idea of a localised Flood appearing to have more geological support. While divergent voices have arisen from within the church as to the role of scripture and science the church appears to have maintained a clear position, guided by the narrative of its origins in the 19th century. This narrative centres around a foundational belief in the literal historical accuracy of scripture, in particular of the book of Genesis in relation to the Flood, and also a belief in Ellen White's metanarrative involving her vision of Creation and the Flood. But more than one hundred and fifty years later the church is being challenged to consider other options for using scripture and Ellen White's writings in a world enormously different from the mid-nineteenth century. It is hoped that an open constructive dialogue between those holding different viewpoints will ensue as the church responds to some of the loyal but divergent views about the Flood and the role of Scripture which have surfaced over the last two decades. This will ensure that the church will progress in its broader mission of being a source of healing to a world in great need.

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