

The Geoscience Field Study Conference of 1978

by Lawrence Geraty

Truck drivers on western American highways during July and August of 1978 were startled to hear their citizen band radios crackling with debates concerning the age of the earth and the extent of the Noachian Flood. The 20-car caravan they overtook included 84 Seventh-day Adventist administrators, Bible and science teachers, editors, students, spouses and children participating in the fifth geoscience field study conference sponsored by the Geoscience Research Institute (GRI)* from July 16 to Aug. 12, 1978 (see the list of official participants.) The CB discussions, the formal lectures at sites visited in seven western states (see map, p. 41), and the assigned reading revolved around two scientific questions and their theological implications: 1) How old is life on earth? and 2) Did the Noachian Flood produce nearly all the fossiliferous rock strata in the earth's crust? These two questions were linked together by the assumption that a defense of a short chronology for life on earth together with a literal seven-day creation week was possible only if the Flood deposited nearly all the rock strata.

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The whole effort of the field study conference, carefully conceived and efficiently organized, was characterized by one participant "as analogous to a group of lawyers persuasively arguing its case before a jury without any contrary evidence admitted before the bar." Though not a completely fair assessment — since contrary data were available in the assigned reading, were consciously addressed in occasional lectures, and did often surface in discussion — it, nevertheless, aptly characterizes the intended and dominant approach of the conference. Such an approach was welcomed by many of the conference members. It confirmed their convictions and fortified their faith.

On the other hand, since the group consisted largely of scholars (in contrast to the two other most recent field conferences of 1976 and 1977, which were organized primarily for administrators), many were not used to a method of presentation which selectively marshalled the evidence in favor of denominational interpretations. One professor suggested, "Because of our training, most of us would have been more at home

*GRI was established under General Conference sponsorship by the Autumn Council of 1957. One of the institute's major goals was to find support for the traditional interpretation of the Scriptural accounts of special creation and the Noachian Flood.

with an approach that would have looked at *all* the pertinent data, considered the strengths and weaknesses of current evolutionary and creation-flood models, and then attempted to discover and set forth the harmony between revelation through God's Word and revelation through His works." This is not to suggest that such attempts were not made, but when they were they left others in the group with an uneasy feeling that (their interpretations of) the Bible and the writings of Ellen G. White had not received due priority. At each of the sites, lectures and discussion highlighted the basic issues raised by what the participants were shown.

July 16-19, Area Around Carlsbad, New Mexico. At the beginning of the trip, Ariel Roth presented nine theological models for the earth's origin — ranging from creation in seven literal days about 6,000 years ago at one end of the spectrum, to naturalistic evolution at the other. Roth suggested that as one moves along this spectrum God becomes less important; by implication, the only acceptable model is creation in seven literal days about 6,000 years ago.

The Carlsbad area was the first test of the suggested model. There we studied in some detail a 50-mile-long, semicircular reeflike structure from the Permian "Period." (See geologic column, p. 34. The relative sequence of the geologic column in the earth's crust was accepted by the GRI staff, though not its time implications.) The "reef" featured a massive core said to be built up by organisms, talus built up by debris sliding down from the core toward the basin, and back reef or shallow lagoon deposits.

In a lecture about modern reefs, Roth concluded, after extrapolating from maximal growth rates of a couple of coral species, that even the largest modern reefs could have grown within a 6,000-year time frame. Even so, this conclusion poses a problem if Carlsbad's Permian reef is in position of growth. A reef of this size certainly could not grow in a single year. This forces one to place the Flood somewhere else in the earth's crust — either above or below the reef. That might be possible if such in-position-of-growth features characterized the Permian

Period only. We learned, however, that they occur throughout the geologic column. The only acceptable alternative apparently allowed by a 6,000-year model is to conclude that the reef cannot be in position of growth; hence, Roth pointed out some difficulties in the standard interpretation and suggested at least part of the "reef" complex could have been washed into place during the Flood.

The reef presented many separate but related problems. For instance, salt beds with some 200,000 layers occur in the basin in front of the reef. The usual explanation is that these layers formed by evaporation of sea water over a long period of time — perhaps 200,000 years. Clyde Webster presented an alternate transport model associated with the Flood.

There was also the problem of solution features in the limestone core of the reef, represented most dramatically by the Carlsbad Caverns. The caverns were considered to be of post-Flood origin. On a 6,000-year model, however, this requires very rapid lithification and solution rates because we are locked in by the occurrence of the Flood about 4,300 years ago (one may add 1,000 years to that figure if following the Septuagint genealogies) and carbon-14 dates from within the cave. In a major lecture, Robert Brown said that carbon-14 dates can generally be accepted as far back as the 4,000 years for which we have historical confirmation. Because Brown's chronological interpretation of the Genesis genealogies does not allow him to place the Flood earlier than about 5,000 years ago, Brown suggested factors which might have produced major changes in the relationship between C-14 time and calendrical time immediately after the Flood. He showed how changes in the earth's magnetic field coupled with fossilization during the Flood of the carbon in pre-Flood plants and animals could compress all carbon-14 dates between 40,000 (70,000 given new methods) and 4,000 into the short period of time between the Flood and the earliest fixed historical date of 1991 B.C.

July 19-21, Northeastern New Mexico. As the caravan passed Clovis and Folsom, two

successive type sites for extensive paleo-Indian cultures, Edward Lugenbeal introduced the group to the archaeology of north-eastern New Mexico. He pointed out the data that suggest an old world origin for new world Indians. Though this relationship fits the Biblical data nicely, it soon became obvious that the evidence for the time involved provided a convenient test for Brown's reinterpretation of carbon-14 dates. The carbon-14 age of the Clovis and Folsom cultures is at least 10,000 years. This implies the arrival of man in the new world was complete prior to 4,000 years ago. The question is whether man, after migrating from the Tower of Babel, could in a few generations populate the new world from Alaska to Argentina where at scores of correlated sites successive paleo-Indian cultures are associated in a vertical stratigraphical sequence with successive kinds of bison and other animals.

At Capulin Mountain, a volcanic cinder cone, we heard of archaeological finds that had

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been related to Capulin lava flows with anomalous results. The potassium-argon dates assigned to the flows are much older than the carbon-14 dates assigned to the archaeological materials even though the flows cover the archaeological finds. According to Brown's lecture on radiometric dating, such examples throw into question the basic assumption that radioactive “clocks” were “set to zero” when the mineral was either formed or deposited at its present location; rather, the mineral inherits source-area radiometric age characteristics. The implication was that there are so many difficulties associated with making historically correct interpretations of

radiometric age data that they do not preclude a 6,000-year history of life on earth.

July 21-23, Colorado Springs Area. The most important stop in the Colorado Springs area was at Crystola where we were shown good examples of clastic dikes, foreign bodies of sandstone intruded into crystalline granite. The standard model separates the formation of these two rocks by hundreds of millions of years. During such a vast span of time, the sand should have turned into sandstone, but according to Roth the clastic dikes could not have formed if the sand had, in fact, become sandstone. He concluded that contrary to current geological views, the dikes must have formed at approximately the same time as their host rock, not hundred of millions of years later.

July 23-26, Central Wyoming. To the west of Laramie, our route took us over the Snowy Range of the Medicine Bow Mountains where sedimentary Precambrian rocks are exposed. Some SDA scientists believe Precambrian rocks can sometimes be as old as their radiometric ages imply. Later in the field conference, Robert Brown gave a lecture that clarified this point of view. Brown marshalled an impressive list of evidences for the antiquity of the solar system and a lifeless earth. He suggested these evidences could be explained by the apparent age concept as design features of a recent creation, or accepted at face value as features that developed in the normal operation of the universe for billions of years prior to the Genesis creation of life. In the absence of explicitly revealed instruction to the contrary, he preferred the latter. Therefore, based on the position of Precambrian rocks in the earth's crust and on the assumption they contain no bona fide fossils, some Adventist scientists have speculated that Precambrian rocks were formed *prior* to Creation Week. Of importance to the conference, therefore, was the fact that the Precambrian rocks Harold Coffin showed us contained laminated structures called “stromatolites,” thought by geologists to be organic in origin, perhaps formed by algae. If these stromatolites are evidence for life, the age of at least some Precambrian rocks and their relationship to Creation Week and the Flood is placed in a different light.

The highway passing along Wind River Canyon made possible spectacular viewing of Mesozoic, Paleozoic and Precambrian rocks, including the contact between Cambrian sediments and Precambrian granite. The latter is so severely decomposed (interpreted as a consequence of weathering) it appears to have seen considerable passage of time before the Cambrian was laid over it. We learned that decomposed horizons occur throughout the geologic column. These horizons (if the result of normal weathering) are difficult to square with the theory that most of the rock layers were deposited in one year by the Flood.

Another important question posed by Wind River Canyon and others through which we passed was why the course of the river cut directly *through* the mountains instead of taking the path of least resistance *around* the mountains? A currently popular explanation is the theory of “superposition.” According to this theory, the rivers originally flowed over the top of mountain structures that were buried by a covering mass of sediment. As removal by erosion of this less consolidated cover mass occurred, the rivers were let down and began cutting into the mountains through which they now flow.

Though reasonable, this explanation has certain unresolved problems and seems to require more time than a 6,000-year model can allow; hence, alternate hypotheses were suggested such as that cracks were formed as the mountains were catastrophically uplifted and the rivers sought out these cracks. Whatever the explanation, we learned that evidence for temporal breaks within this sequence of events (the uplift of the mountains, the filling of the basins with tens of thousands of feet of sediment eroded from the fringing mountains, and the subsequent removal through erosion of much of this basin-fill sediment) is a knotty problem for those who would attribute all these events to processes related to the Noachian Flood.

An important example of catastrophism was pointed out in the many exposures of the low-angle Heart Mountain detachment or gravity fault which we passed. As a prime example of “out-of-order” rocks (Mississippian rocks *above* Eocene rocks), it has been used by some to denigrate the concept of a geologic column. Coffin explained, however, that there is clear evidence the Mississippian rocks were thrust up over the Eocene rocks, and though it cannot be used to negate the standard geological sequence of rocks and fossils, it is important for a Flood model because tremendous blocks of sedimentary

GEOLOGICAL COLUMN

Era	System or Period	Series or Epoch	Estimated Age in Millions of Years
	Quaternary	Recent Pleistocene	2.5
Cenozoic	Tertiary	Pliocene	7
		Miocene	26
		Oligocene	38
		Eocene	54
		Paleocene	65
Mesozoic	Cretaceous	Upper, Lower	136
	Jurassic	Upper, Middle, Lower	190
	Triassic	Upper, Middle, Lower	225
Paleozoic	Permian		280
	Pennsylvanian	Upper, Middle, Lower	325
	Mississippian	Upper, Lower	345
	Devonian	Upper, Middle, Lower	395
	Silurian	Upper, Middle, Lower	430
	Ordovician	Upper, Middle, Lower	500
	Cambrian	Upper, Middle, Lower	570
	Precambrian	Upper, Middle, Lower	4000

rock have been moved over great distances on a very low gradient. Just how they could be deposited and indurated during a year so they could slide and detach in the same year would still be a problem, however.

July 26-30, Yellowstone Region. The key reason for visiting Yellowstone was to see the fossil forests made famous in Adventist circles by Richard Ritland (and others) and reported in SPECTRUM, Vol. 6, Nos. 1-2 (1974), pp. 19-66. There he described some 40 buried forest levels in the Gallatin Mountains and discussed the evidence that the petrified stumps were in position of growth. Coffin acknowledged that the *in situ* model "is so obvious and so natural, that any alternate explanation would appear strained if not incredible," but because of the problems posed for a short chronology for the history of life and the evidences observed in the field, Coffin proposed that the forests were drifted to their present locations by water and then buried by volcanic mud slides. Since his views are presented elsewhere in this issue (see pp. 42-53), I will not elaborate, except to note that his conclusions were supported in a lecture by Ivan Holmes, who argued that X-ray diffraction, infrared and spark source mass spectrometry analysis of the mineral contents demonstrate a close similarity in the sequence of volcanic sediments — evidence that might be difficult to account for if there had been many eruptions widely separated in time. While some participants felt Coffin's research constituted a major achievement, a number of others thought the field evidence warranted suspension of judgment.

July 30-Aug. 1, Western Wyoming. The reality of a Pleistocene Ice Age is so strongly supported by the data that few would quarrel with its existence. The various lines of evidence were clearly presented both in the field and in lectures by Edward Lugenbeal. We learned that an Ice Age is compatible with a 6,000-year chronology only if it occurred immediately after the Flood and the continental ice sheets grew and melted at maximum rates. Unfortunately, numerous Pleistocene outcrops suggest a major period of bedrock weathering prior to the onset of glaciation. Furthermore, on the basis of rela-

tive weathering and erosion, in the vicinity of Pinedale we were able to distinguish at least three distinct sets of glacial deposits. We were given the evidence for these deposits representing glacial periods separated by nonglacial intervals. Each glacial period was punctuated with advances, standstills, retreats and readvances of its own. Thus, the story on glaciation appears far more complex than can be accounted for in a single glacial period. On Brown's carbon-14 transformational model, we learned that all of this was completed at least 4,000 years ago. Hence, the defense of a short chronology necessitates the development of alternative explanations for the differences in erosion (less difficult to do) and weathering (more difficult to do) between the various sets of glacial deposits. In addition, we learned that we will have to contend with mounting evidence for glaciation not only in the Pleistocene Epoch (post-Flood in most models), but also in the Upper Paleozoic, Lower Paleozoic and even Precambrian. It obviously will be difficult to accommodate several ice ages within the year allotted to the Noachian Flood.

As if this were not a difficult enough task, Lugenbeal pointed out further data that pose constraints on a short chronology. Since each glacial event destroys much of the record of previous events, the sedimentary record in glaciated terrains is extremely discontinuous. This means that for a relatively continuous record one must look elsewhere. More complete records of Pleistocene climatic history have been found in deep sea sediments, lake sediments, peat bogs and polar ice sheets — and all seem to confirm the theory of numerous glaciations separated by nonglacial periods. Radioactive dating techniques indicate these records span 3,000,000 years of time. In an attempt to test this radioactive timescale, Lugenbeal presented a ratio chronology that was completely independent of radioactive methods. It was based on the assumption of relatively constant rates of sedimentation in deep sea sediment cores and calibrated by means of counting what are thought to be annual layers in lake sediments. The concurrence between these completely

independent timescales was excellent — a concurrence that can scarcely be purely coincidental.

Aug. 1-2, Southwest Wyoming/Northeast Utah. The oil shales of the Green River Formation found in Wyoming, Utah and Colorado are well known for their fossilized fish. The field conference route took us through some excellent exposures of this formation traditionally thought to have been deposited in a deep Eocene Epoch lake. We were able to find several fossil fish for ourselves in the alternating layers of paired laminae. These couplets (“varves”) — one dark and composed of organic material, the other lighter and made up of calcium carbonate — are commonly thought to have been deposited annually on the lake bottom. Several million sequential Green River varves present an obvious challenge to a short chronology.

Knut Andersson reported that Paul Buchheim, of Loma Linda University, while accepting the standard view that the Green River Formation was deposited in a lake, has found convincing evidence that at least some of the “varves” were not annual. Furthermore, he found no detectable evolution in the fish from bottom to top such as one would expect in millions of years, nor enough fossilized fish feces to span such a time. But even if the laminations are interpreted as daily, some ten to twenty thousand years would be involved, and, of course, given clear stratigraphic relationships, this would all be post-Flood and pre-Pleistocene glaciation.

The Green River Formation is approximately the same geologic age as the Yellowstone fossil forests; consequently, it is difficult to have the latter being floated into place by the Noachian Flood, while just to the south one has the fluctuating fortunes of a living lake. Nor can one escape this dilemma by claiming that Eocene in one location is not contemporary with Eocene at the other, because in this case there is a physical stratigraphic tie between the formations in question.

Aug. 2-5, Central Utah. In the Salt Lake City area, we learned that the ancient shore lines so easily identifiable up to 1,000 feet or so above the present great Salt Lake, are *not* evidence for the universal deluge as

suggested by Price and the *SDA Bible Commentary*, Vol. 1, but rather remnants of a shrinking (post-Flood?) lake. Further, we learned that under the Great Salt Lake, a 1,000-foot core of sediment seems to indicate that the lake basin filled up and dried out many times, and that the latest such cycle ties in directly with the last stage of glaciation.

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As we moved through mining country, it was natural to consider the origin of some of these minerals. Clyde Webster reported his significant discoveries with regard to the development of uranium ore. So-called roll-front deposits of this mineral, in the standard model, have been thought to have developed over thousands of years. But in his laboratory, Webster has been able to develop them in months in the presence of organic material. This could be a genuine scientific breakthrough.

Of major interest also was the origin of coal, commonly thought to be plant material that accumulated slowly in ancient peat bogs. Harold Coffin presented the evidence against this view and suggested coal beds were washed in by the Flood as mats or masses of floating vegetation. Coffin emphasized the lateral extensiveness and thickness of some seams (compressed from much thicker layers of vegetation), and the even, smooth nature of their top and bottom surfaces as evidence against the standard theory. We did learn of some counter evidences — for example, the predictability of the location of coal beds by geologists prospecting for coal. In a flood would not there be more randomness and

accident? Deep in a coal mine, we observed perhaps the most dramatic counter evidence — dinosaur tracks and trackways on top of coal seams. (The miners we talked to stated they almost invariably found tracks preserved at the top of coal seams.) Later, we learned of one exposure where tracks coming from several directions converged on upright fossilized stumps that were rooted in coal beds! If coal seams represent mats of vegetation afloat in flood waters, how were they able to bear the tonnage of so many dinosaurs at so many levels, and where were the beasts going?

Aug. 5-10, Grand Canyon Region. Several issues concerned us in the Grand Canyon region. One was how the Grand Canyon could have been formed in a few years. Because of the carbon-14 dates from Indian caves on the riverbank, we know the canyon looked essentially as it does today at least 4,000 years ago; thus, on a 6,000-year model one has only a few years to deposit, cement and then erode this sedimentary sequence. Of the various models available, Roth preferred a model that postulated the rapid draining of ponded water bodies through a cracked dome. He repeatedly called our attention to the conformable nature of many of the Canyon's rock strata as a strong argument against the passage of long periods of time; otherwise, he indicated, one would expect to see huge valleys and canyons similar to the ones we were seeing on the modern Colorado Plateau between these rock strata. We viewed the conformable nature of the rock strata not only from Dead Horse Point and the North Rim but also on a hike down the North Kaibab Trail.

We did not hear about the Cambrian layers that at some horizons contain numerous tubes and possible burrows such as one would expect on a quiet ocean floor. We were not shown the four zones of the Red Wall Formation, each with distinct fossil types such as one would expect in a microevolutionary sequence. Nor did we learn about the unconformity between the Mississippian and the Pennsylvanian rocks, where major evidence for solution activity and cavern development *prior* to the deposition of the Pennsylvanian Period rocks can be seen.

This unconformity extends as far north as Montana where we did see caves and sink holes filled with Pennsylvanian Period sediments in the Mississippian rocks that form the walls of the Big Horn Canyon.

One of the striking formations we did observe in the canyon was the Coconino Sandstone with its large-scale cross-stratification. It has traditionally been interpreted as wind-deposited sand dunes. But Leonard Brand reported that in his laboratory he had been able to produce animal tracks similar to those in the formation better under water than on dry sand. In his field work, he found the tracks always went uphill, so concluded that they represent the tracks of animals escaping from the rising waters of the Flood.

In many ways, the climax of the conference came when Ariel Roth presented a series of lectures on his Flood model. We had been getting pieces for the puzzle all along the way, but it was now that he tried to put it together in an organized fashion by first describing the model, then selecting the evidence that would support it, and finally dealing with certain objections to it. He reminded us that sedimentary rocks are of special interest when considering a Flood model because they represent transported material and contain fossils, which are evidence of past life. On the continents, they form a layer averaging about 1½ km. thick. As the Bible does not seem to allow for life before Creation Week and there is not much time for the accumulation of thick layers of sediment before or after the Flood under normal conditions, Roth's model puts most of these sedimentary layers into the Flood. He suggested that the continents were depressed during the Flood, with subsequent mountain building and continental drift at the end of the Flood. Because the continental masses are lighter and float, sinking them would run counter to natural law; this can be explained solely through divine intervention. As the continents sank, pre-Flood ocean waters rose, bringing with them material, perhaps even fossils, from the pre-Flood ocean floors.

We were told that the repeated alternation

of rock layers with marine and land fossils and the occurrence of fossils of advanced forms of life exclusively in the higher (younger) sedimentary layers can be explained by a theory of “ecological zonation.” According to Roth, the rising waters attacked and sequentially destroyed distinct

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ecological zones and inland seas located at different elevations. The life forms in these ecological zones and seas were then redeposited in more or less the same order they were destroyed. Of course, this theory implies man, mammals and flowering plants and trees were restricted to the uplands of the pre-Flood world (despite apparently contrary descriptions in the writings of Ellen G. White — *Patriarchs and Prophets*, p. 90; *Spiritual Gifts*, p. 62.)

Evidence presented in support of this model included: 1) The renewed trend toward catastrophism in geology, 2) the recently developed turbidity-current concept of rapid subaqueous deposition, 3) the presence of very widespread limestone layers on the continents containing ocean fossils, 4) the deposition of thin distinctive layers over wide distances, 5) the decrease in rock layers with ocean fossils as one goes up the geologic column, 6) the more worldwide distribution of species in the fossil record than now exists suggesting either much transport or a more uniform climate, 7) the paucity of large erosional features between layers, and 8) the claim that local depositional environments are rare in the sediments. In general, however, Roth’s presentations were well reasoned and appreciated, but did not remove

the gnawing feeling that we had already seen enough contrary evidences to wonder if they could ever be adequately explained by a single event — particularly one occurring about 4,000 years ago.

Presentations Unrelated to Geography. Before proceeding to a report of the last region visited on the field conference, I must summarize some of the other lectures given along the way that were very pertinent to the overall concerns of the conference but not particularly related to the locales in which they were given.

Edward Lugenbeal reviewed the evidence on the origin and history of fossil man. He pointed out the discontinuities in the primate record — the missing links between lower and higher forms of primate life and he showed how the recent well-publicized discoveries of the Leakeys in Africa of fossils more manlike than previously known from rock layers of such antiquity demonstrate that the story on fossil man is more complex than first thought. On the other hand, in spite of the discontinuities, there does seem to be a real sequence in the primate fossil record. Creationists will have to deal with this fact.

Using as a basis William J. Shea’s 1977 Geoscience Field Study Conference papers (included in revised form in the 1978 notebook), I summarized the discoveries of archaeology that illustrate the remarkable confirmation back to Abraham of Biblical chronology. But, for the period beyond Abraham, I reflected a consensus of Adventist archaeologists, historians and chronologists in suggesting that the Bible does not make chronological statements. Based on abundant chronological evidence from the ancient Near East, however, I concluded that the foundation of the earliest dynasties in Egypt can hardly be later than about 3,000 B.C. (Two additional factors are important for dating the Flood: A reasonable period for migration from Anatolia and dispersion into these areas, and then a period long enough to accommodate the evidence for prehistoric cultures that preceded the rise of the historic dynastic civilizations.) Now, if the time span suggested above is correct, Abraham came to

Egypt a millennium after the foundation of the first dynasty and half a millennium after the construction of the greatest pyramids. Interpreted chronologically, however, the genealogy in the Hebrew text of Genesis 11 allows for only about four centuries between the Flood and the birth of Abraham.

The conflict between such an interpretation of Genesis 11 and our sources from the ancient Near East is self-evident. There seem to be only three options available in an attempt to resolve the problem: 1) Shorten the chronology of the ancient Near East as iconoclasts such as Velikovsky and Courville have attempted to do — but one is then left with major historical and archaeological, not to mention Biblical, inconsistencies. 2) Lengthen the chronology by utilizing the higher birth ages from a text tradition other than the Hebrew, such as the Septuagint — but since the Septuagint employs a chronological system at other points in Biblical history that can in some cases be demonstrated to be inferior and never superior, it appears that the weight of evidence still favors as the original the Hebrew text, the one underlying Ellen White's chronological system. 3) Lengthen the traditional chronology by suggesting that there is a gap (or omissions) in the genealogy of Genesis 11 — and, in fact, this appears to be the most reasonable option given sound exegetical and theological method unbiased by tradition. Such a conclusion did not set well with a few and provoked animated CB discussions; on the other hand, others were of the opinion that it had the advantage of doing justice to *all* the evidence from both Scriptural and historical revelation.

Richard Hammill, in discussing Biblical chronology, argued that if creation did not occur in six literal days about 6,000 years ago, then the Sabbath doctrine “of the SDA church is not important, and there is no need for a special church like ours.”

Paul Gordon of the White Estate said that some discrepancies did exist in Ellen White's chronological comments on various topics. He suggested that these could be explained by her use of marginal information from her Bible (*Prophets and Kings*, p. 459), by her use of a convenient literary form (*Patriarchs and*

Prophets, p. 138), or by the suggestion that she did not try to settle a question on which the Biblical sources themselves are not clear (whether Israel spent 215 or 430 years in Egypt). Some participants could not see why any one of these reasons could not be applied with equal validity to her 6,000-year statements, though this is not the position taken by the White Estate.

Aug. 10-12, Bryce and Zion Region. After a visit to breathtakingly beautiful Bryce Canyon and Cedar Breaks National Monument, we made a stop in a bristlecone pine forest to discuss the question of dendrochronology. It is of special interest to anyone concerned with the age of life on the earth, because a number of trees in excess of 4,000 years of age have been reported and a master chronology going back more than 7,000 years has been published. The method assumes that one growth ring is equivalent to one year and that two specimens of wood with similar distinctive ring patterns grew at the same time.

Ariel Roth offered several arguments against the validity of the method. He told us that: 1) The chronology is constructed with a high percentage of cross-matched specimens with ring patterns that are not very distinctive. 2) Sometimes there are multiple rings in a given year. (As a visual aid, he pulled out of his pocket a section of a fig branch from a seedling he planted in Loma Linda four years ago — it had 12 rings per year; the obvious implication was that bristlecone pine trees could behave in the same manner — when, of course, presently known specimens, as Roth acknowledged, do not; actually, missing rings are more of a problem.) 3) The chronology cannot be used as an independent check of radiocarbon dating because carbon-14 is used to achieve “ball-park” matching of ring specimens. 4) There are difficulties connected with correlating rings even within a single tree. Roth also raised the issue of scientific integrity because all the data upon which the chronology is based have not been published. Other field conference participants, however, pointed out that this master chronology correlated well with dates ar-

rived at independently long ago by Egyptian archaeology or more recently by varve counts from Lake of the Clouds in Minnesota, and that independent master chronologies are now being developed in Europe and the Middle East for other species with similar results, and that both living bristlecone pine trees and trees older than 4,000 carbon-14 years when the difference in age between the oldest and youngest rings of a specimen is determined by carbon-14 dating and by a ring count.

It is generally known that on the 1976 field conference an ad hoc committee worked on the content of the "statement of belief" dealing with creation and that the last field study conference in 1977 concluded with Willis Hackett from the General Conference discussing this statement and the one on inspiration/revelation. Because these statements, since revised, appeared as the last items in our conference sourcebooks and had been strongly defended by Richard Hammill on the trip, some wondered whether a similar session was planned for us. Our conference, however, concluded with a spontaneous testimony service and a devotional message presented by Robert Brown. He compared us to the spies who were sent out by Moses to spy out the promised land and wondered what kind of report we would take back. Given the denomination's investment in the conference of at least \$60,000, he hoped the influence of our report would aid the church in its divinely appointed mission. Brown felt that while the traditional interpretations of Genesis were difficult to square with many scientific arguments, Adventists could be confident that Genesis 5 and 11 were intended to be complete chronologically and that the figures in the Greek Septuagint text of these chapters were closer to what Moses intended than those preserved in the Hebrew Masoretic text.

What, in fact, was the overall impact of the trip on the participants and what will be its ultimate effect on the church? These questions are particularly hard to answer because of the obvious differences of scientific and theological opinion that characterized the

conference. Some came away convinced, as was Lawrence Maxwell, that: "Although many questions remain to be answered, the Geoscience staff members are increasingly successful in searching out the most accurate data available. More and more, the evidence they are turning up gives scientific support for Creation and the Flood" (*Adventist Review*, Oct. 5, 1978, p. 25). Others, however, felt there were now more questions than before — not with the historicity of the creation and Flood events, but with the timescale and certain of the evidences advocated. They preferred to take the view of William North Rice, concluding that it was even truer today than when he articulated it more than a century ago, "Let the lesson of the past be heeded. As one theory after another, supposed to be inseparably connected with Christianity, has been swept away, Christianity has but risen from the shock stronger and purer. . . . The foundation of our faith will remain unshaken in the future as in the past, whether the sun revolves around the earth, or the earth around the sun, . . . — whether the duration of man's existence be six thousand or sixty thousand years. . ." (*New Englander*, 26 [Oct., 1867], 634-635).

The 43 official participants included the following conference members in addition to GRI staff:

from the General Conference: Orley M. Berg (Ministerial Association), Paul A. Gordon (E. G. White Estate), Willis J. Hackett (General Vice President) — part-time, Richard Hammill (General Vice President) — part-time, F. E. J. Harder (Board of Higher Education), Charles R. Taylor (Education);

from the Inter-American Division: David H. Rhys (Education);

from Andrews University: Lawrence T. Geraty (Old Testament and Archaeology), A. Josef Greig (Religion), S. Clark Rowland (Physics), John Stout (Biology), Douglas Waterhouse (Religion);

from Loma Linda University: William M. Allen (Chemistry), Brian S. Bull (Pathology) — part-time, Leonard Brand (Biology) — part-time, Ivan Holmes (Administration) — part-time, Edwin Karlow (Physics) — part-time, Jack W. Provonsha (Religion), Ivan Rouse (Physics), Clyde L. Webster, Jr. (Chemistry);

from Columbia Union College: Donald G. Jones (Chemistry), Luis A. Oms (Mathematics and Physics);

from Pacific Union College: Vernon Winn (Chemistry);

from Southern Missionary College: Henry Kuhlman (Physics), David A. Steen (Biology);

from Union College: Ward Hill (Religion), Richard Tkachuck (Biology);

from Walla Walla College: Ronald Carter (Biology and Religion);

from Antillian College: Loron T. Wade (Theology);

from Seminar Marienhöhe: Heinz Zech (Mathematics);

from West Indies College: Gerald Vyhmeister (Science);

from Home Study Institute: Ted Wade (Administration);

from The Pacific Press: Editors Lawrence Maxwell, Max Gordon Phillips, Humberto Rasi;

and graduate students: Knut Andersson (geology, University of Wyoming) — part-time, Richard Bottemley (physics, University of Toronto), William Fritz (geology, University of Montana) — part-time, and Eckhard Huefing (religion, Andrews University).

