Analysis of 1978 Annual Council
SDA Professional Organizations

SPECTRUM

A Quarterly Journal of the Association of Adventist Forums Volume 9, Number 4

GENESIS

A Century of Adventist Creationism
1978 Geoscience Field Conference
Yellowstone Forests and the Flood
Genesis 1 as Theology

SPECTRUM

Association of Adventist Forums

SPECTRUM is a journal established to encourage Seventh-day Adventist participation in the discussion of contemporary issues from a Christian viewpoint, to look without prejudice at all sides of a subject, to evaluate the merits of diverse views, and to foster Christian intellectual and cultural growth. Although effort is made to ensure accurate scholarship and discriminating judgment, the statements of fact are the responsibility of contributors, and the views individual authors express are not necessarily those of the editorial staff as a whole or as individuals.

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In This Issue

ARTICLES **Volume Nine, Number Four, Published January 1979**

About This Issue

During the first six years of this journal's publication, the years of Molleurus Couperus' editorship, articles concerning the relationship of science and religion appeared frequently. We are happy to return to this enduringly important topic. Not only is science the focus of this number of SPECTRUM, but also additional articles on the subject will be published in the next and subsequent issues. "Genesis," the heading for the current cluster, refers both to the act of original formation and also to the first book of the Bible.

All the articles in this issue's cluster coincide in referring to the Biblical account of the original formation of the world, but they do so from a variety of perspectives. Ronald Numbers, as an Adventist historian of science, provides an overview of debates within Adventism concerning science and religion from even before the organization of the denomination to the formation of the Geoscience Research Institute. Lawrence Geraty advances the account to the present by recalling what he learned and heard this past summer while being introduced to the topic of geology on the most recent field trip conducted by the Geoscience Research Institute. One of the scientists at the Institute, Harold Coffin, has kindly allowed us to publish a version of the lecture he delivered on the field trip. A longer form of his article describing important research on the fossil forests at Yellowstone Park (also discussed by Richard Ritland in SPECTRUM, Vol. 6, No. 1-2) is available by writing Dr. Coffin at the Geoscience Research Institute, Andrews University. Finally, after readers have taken a historical and scientific look at the topic, they can read Herold Weiss' theological analysis of the creation account in the book of Genesis.

Also in this issue are two articles on the shape of the Adventist community. Donald McAdams, a delegate to the 1978 Annual Council, analyzes the forces at work in that session and the degree to which its actions will have enduring significance for the Church. Jocey Fay's useful listing of professional associations within the Adventist denomination reveals their remarkable growth and strength. Organizational theorists have long considered that one way to measure the health of a society is to examine how vigorously voluntary associations flourish within it. If they are right, Adventists should be reassured by Jocey Fay's article.

The Editors

The 1978 Annual Council: A Report and Analysis

by Donald R. McAdams

None of the delegates could anticipate the most momentous action taken by the 1978 Annual Council — the election of a new General Conference president, ushering in a new era in the denomination's history. But before the delegates assembled for the opening meeting, Oct. 10, they had received from Clyde Franz, secretary of the General Conference, a letter, enclosing a preliminary agenda and calling particular attention to three items: a request from the regional conference presidents to establish two black unions in the North American Division, a request from health care administrators to take hospital supervisory personnel and union health care corporation officers off the General Conference wage scale and pay them according to community wage rates, and the introduction of major changes in the church retirement plan.

In his opening address to the delegates, General Conference President Robert H. Pierson abandoned the traditional sermon for a report on the state of the church. He projected that by the time of the General Conference Session membership would reach 3,265,000. The goal, he stated, referring to the theme of the Annual Council, "Harvesttime," was 1,000 baptisms a day. The report reviewed the evangelistic activities of the church, department by department. Clearly, in Elder Pierson's view, each agency and institution of the church is evaluated by measuring its contribution to winning converts. "Evangelism," he said, "is still the watchword of the hour." "This is the time for worldwide advance." "Victory may yet be ours in our day."

The following morning, Wednesday, Oct. 11, the secretary and treasurer gave their official reports to the delegates. K. H. Emmerson noted that as of Oct. 1, 1978, exchange rate adjustments had cost the church nearly $5.5 million. That morning, an important action was taken to broaden representation at the 1980 General Conference Session. The delegates voted that at least ten percent of the regular delegates to the 1980 session must be women, youth and church members not denominationally employed, and at least one-third of the regular delegates from each union must be citizens of the country or countries of the union. (This makes it less likely that an American missionary will be chosen as a delegate to represent an overseas union.) Some new procedures were adopted for the General Conference Session Nominating Com-

Donald R. McAdams, who received his doctorate from Duke University, has taught history at Andrews University. He is the president of Southwestern Adventist College.

mittee to insure that each division, including the North American Division, has access to the full nominating committee when nomination is made for workers assigned especially to that division.

Concommitant with the leadership's commitment to increased internationalization of the church was the evolution of the North American Division into a separate division organization. To bring this about, the General Conference Committee was asked to "thoroughly explore the advisability of restructuring the relationship between the North American Division and the General Conference, including the creation of a separate division organization, structured along the same lines as the present world divisions, . . ." This study is to be completed well before the 1980 General Conference Session.

By midafternoon on Wednesday, nearly everyone was talking about the upcoming debate on the proposal to form two black unions in the North American Division. (For two opposing views on this proposal, see SPECTRUM, Vol. 9, No. 3) It was rumored that reporters from the *Washington Star* and *Washington Post* would be in the gallery the next day, as well as scores of black pastors from all over the east coast.

The business meeting on Thurs., Oct. 12, began at 9 a.m. with the council sitting as the North American Division Committee on Administration (NADCA), and with Neal Wilson presiding. Following Elder Wilson's opening remarks, there was a frustrating 45 minutes of parliamentary confusion before a positive motion was placed before the council to create two black unions within the North American Division.

G. R. Earle, president of the Northeastern Conference, began the debate by summarizing the arguments in favor of black unions. They allow 1) greater cohesiveness for the black work, 2) easier transfer of black workers from one conference to another, 3) more effective evangelism in the inner cities, 4) provision of better educational opportunity for black young people, 5) increased visits to black churches by union departmental men, 6) greater upward career mobility for black administrators, 7) black representation at meetings of union presidents on the basis of equality. Elder Earle also suggested that regional conference subsidies to union colleges and black representation on union college boards should remain unchanged.

Calvin Rock then took the floor and enthralled both black and white delegates with a masterful speech. "This is an animated debate," he said, "but no one is angry." To clarify the issue, Rock listed what black unions were not. They are not, he said a cop-out on brotherhood, a rebellion nor "the hasty efforts of ambitious men wanting union jobs." Rather, he said, they are recognition of the fact that we are culturally two different people. "We believe we can be culturally twain and spiritually one." The high point of Rock's presentation came when he referred to church leadership and specifically to Elder Pierson. He acknowledged that Wilson and Pierson were opposed to black unions, but then, in reference to the recent pronouncement by Spencer Kimball, president of the Church of Jesus Christ of Latter Day Saints, who recently announced a revelation that improved the position of black men in the Mormon Church, he turned directly towards Elder Pierson and added with a touch of humor in his voice, "I could wish that the President of the General Conference would stand up like the Mormon head recently did and say, 'I have had a revelation.'" For the first time of the day, there was laughter and general applause.

Rock then called upon all eight black regional conference presidents to come forward. It was a dramatic moment. One by one they gave their reasons for favoring black unions. One president stated that, though he enjoyed his work greatly, he had been president of his conference since 1962 with no opportunity to transfer to another field. The black conference presidents made it abundantly clear that one of the central issues was power. L. R. Palmer, Jr., president of the Allegheny East Conference, stated it most forcibly when he said, "Black unions are not the multiplication of position, but the sharing of power."

It was not until midafternoon that Elder Wilson, still chairman of the council session,

rose to speak for the President's Executive Advisory Committee (PREXAD). He recounted again, this time in more detail, the history of the request for black unions. The first formal request in 1968 was renewed in 1971. Partially in response, the Annual Council of 1971 accepted 16 points to increase integration and improve opportunities for blacks within the existing church structure. As a part of this program, blacks were moved into union officer positions throughout the North American Division. In mid-1976, continued Elder Wilson, black leaders, seeing little implementation of the 16 points, renewed the request for black unions. PREXAD looked carefully at the proposal, setting up study groups and commissioning position papers, but responded negatively to the black conference presidents at the 1977 Annual Council.

Following this rejection, which was made public on the back page of the Oct. 27 *Review*, black leaders carried the issue to their own people. This activity led to a reconsideration of the question at the 1978 Spring Council and referral once again to PREXAD. Now, for the second time, said Elder Wilson, PREXAD recommended rejection

"The high level of debate made it abundantly clear that no disagreement could stand in the way of the common commitment of black and white speakers to the work and unity of the church. . . ."

of the request. He acknowledged that one research study reported that 52 percent of black Adventists favored black unions and 80 percent desired substantive changes, but he said that this was not the time to pull farther apart and spend the additional $1.5 to $2 million annually required to set up and support two black unions.

Elder Wilson then yielded the floor to Martin Kemmerer, under-treasurer of the General Conference. Elder Kemmerer used a chart to show that 52 percent of the $8,379,000 that came to the General Conference from black Adventists in 1977 was returned directly to the black work in North America. W. L. Murrill, assistant treasurer of the General Conference, added that regional conferences were not unfairly supporting the church retirement fund as some had charged. Concluding the comments on finances, Elder Wilson stated that, in his opinion, two black unions, if created, would have to carry the full financial responsibility for Oakwood College.

One of the high points of the day's oratory came when Elder Wilson yielded the floor to C. E. Bradford, associate secretary of the General Conference for North America. Elder Bradford was ostensibly speaking in support of the PREXAD position, but after indicting the union conference presidents for failing to take pastoral care of their regional conference presidents, he brought down the house with a quotation from the 1930 General Conference minutes that rejected Negro conferences with some of the same arguments that Elder Wilson had used earlier in the afternoon to show why regional unions were not in the best interests of the church.

The council adjourned at five-thirty and reconvened at six forty-five. In intelligent and spirited speeches, prominent black and white church leaders spoke both for and against the establishment of black unions. Those black delegates who opposed black unions expressed concern that this step would weaken the commitment to integration and fellowship between the races. The attitude of the whites who supported black unions was best summarized by Dr. Josephine Benton, associate pastor of the Sligo Church. "Perhaps," she said, "we can show our brotherhood best by saying we trust you enough to allow you to judge for yourselves how best to carry on your work." Spontaneous applause echoed through the church. Following Elder Pierson's summation of PREXAD's position and the offering of two prayers, the delegates cast secret ballots rejecting 190 to 53, the motion to estab-

lish two black unions in the North American Division.

Though it may be true that a majority of the black delegates present supported the motion, and a majority of the white delegates present opposed it, the council was not split on racial lines. Among black delegates, departmental workers appeared to be the likeliest opponents of black unions. White conference presidents seemed most likely to support the proposal. The strong opposition of Elder Pierson and Elder Wilson was decisive. Most delegates were strongly inclined to follow the counsel of the top administrative officers of the church. The high level of the debate made it abundantly clear that no disagreement could stand in the way of the common commitment of black and white speakers to the work and unity of the church, an important fact, since the request for black unions will probably come before the council again.

Recognizing the need for greater interaction between blacks and whites, the council did accept, on Monday afternoon, Oct. 16, a report from the Commission on Strengthening the Black Work in North America. The Office of Regional Affairs in the General Conference will be replaced by an Office of Ethnic Relations. The office will initiate programs bringing about greater interaction between blacks and whites at church and conference levels and improving employment opportunities for minorities. Since the Executive Committee of the office will be chaired by the vice president of the General Conference for the North American Division and include the top General Conference administrators in the fields of health services, education, publishing and the Ministerial Association, the office has the potential for exercising considerable power within Adventist institutional life. The director of the office will hold the title of Associate Secretary of the General Conference. In addition to these structural changes in the General Conference, the council voted to place in the *Church Manual* a positive declaration on ethnic relations and include in the baptismal vow a statement defining the church as a multiracial, multiethnic fellowship.

The second major agenda item that Elder Franz had brought to the attention of the delegates in his Sept. 21 letter, the hospital wage scale, was introduced by Elder Wilson to the council, sitting as NADCA, on Sunday morning, Oct. 15. The problem, he said, was that the church had established new hospitals or expanded existing ones without adequate denominational personnel to staff them. In order to attract non-Adventist health care professionals, hospitals began paying community rates of pay. Of course, Adventist employees, performing equal work, expected equal pay. Consequently, Adventist hospitals abandoned the denominational wage scale and paid community rates. Only hospital administrators and other top supervisory personnel remained on the lower denominational wage scale. For some time now, said Elder Wilson, some of these administrators have been receiving additional compensation by such methods as personal use of a hospital-owned car, drastically reduced rents for hospital-owned housing, or low interest home loans. Recognizing that they were acting out of policy, the union health care corporations that own and operate most Adventist hospitals were now recommending to NADCA that hospital administrators and supervisory personnel receive salaries comparable to those paid to equivalent employees in non-Adventist hospitals. The implication, never made explicit, was that hospital administrators would no longer work for the denomination unless they received higher wages.

Our options, concluded Elder Wilson, were to: 1) close or sell the hospitals, 2) transfer the hospitals to nonchurch owned and controlled corporations, 3) establish corporations at arm's length from the church, but still including church leadership on the corporation boards, 4) try to return the hospitals to a strict denominational wage scale, which, said Elder Wilson, was "desirable but totally impossible," 5) maintain the status quo, which, said Elder Wilson, was not honorable because these policies were not presently being followed, 6) the only practical option, in his opinion: establish a separate wage scale.

The proposal now placed in the hands of

the delegates called for the administrator's salary to be computed by multiplying the arithmetical mean for all nurses' wages in a given hospital by 195 percent. This, for example, would give the administrator of the White Memorial Hospital an annual salary of $30,420 in addition to regular educational, medical and retirement benefits received by most other denominational employees. If this method did not bring the hospital administrator's wage into line with community rates, the hospital board would be allowed to move its administrator to a maximum of 90 percent of the salary paid to the highest-paid administrator in the Adventist system of hospitals. Strict controls would be established to make sure that no additional compensation was paid by methods currently in use. With this policy, concluded Elder Wilson, "we have reached an honorable agreement." It was clear that negotiations had been going on between two almost equal powers and that the church was losing its ability to make policy for Adventist hospitals.

During the debate that followed, it became very apparent that the great majority of the delegates were opposed to the recommendation. Even those who supported the recommendation frequently acknowledged that they did so with great reluctance. Some speeches against the motion pointed out the inconsistency of paying some classes of church workers at community rates, even if they were generating income from non-Adventist sources, when other classes of church workers, such as industry managers at colleges and universities, also generated income from non-Adventist sources and yet remained on the denominational wage scale. Dr. Charles Hirsch, executive secretary of the Kindergarten through Grade Twelve Board of Education, pointed out that at Loma Linda University the president of the university would now makes less than the hospital administrator and his associates, as well as the deans of all the health-related schools. Several speakers referred to the explicit counsel given by Ellen White in the 1890s opposing higher wages for Adventist physicians and publishing house managers who, at that time, generated the majority of hospital and publishing house incomes from non-Adventist sources. D. A. Delafield, associate secretary of the White Estate, strongly and movingly urged the delegates to follow the counsels of Ellen White and have faith that the Lord would provide a solution to this problem.

When the time came to vote, the chairman asked for a show of hands instead of taking a secret ballot. With a large majority abstaining, the proposal carried. It seemed obvious that most delegates opposed the motion, but the position of church leaders was unequivocal. Following the unwritten rule that commits union presidents, who have gone over important agenda items in advance, to support proposals that meet strong opposition, several union presidents joined the chair in support of the motion. Reluctant to oppose church leaders and unwilling to accept the consequences of saying no to the health care administrators, the majority of the delegates silently watched the proposal become church policy.

The action on the hospital wage scale continued a trend pointed out by Tom Dybdahl in his analysis of the 1976 Annual Council (SPECTRUM, Vol. 8, No. 2). Commenting on the actions of that year regarding divorce and remarriage, the functions of the licensed minister and the use of tithe, Dybdahl identified as a trend the "accommodation of the policies and standards of the church to existing practices or current situations." The action of the 1978 Council on the hospital wage scale demonstrated again the church's willingness to solve administrative problems with pragmatic solutions, even if these modify significantly historically held positions that, in the minds of many, are based on the writings of Ellen White. Church leaders interpreted and applied the writings of Ellen White in administrative areas more freely than they allow scholars to interpret and apply them in scientific, historical or theological areas.

Of course, the most dramatic moment of the 1978 Annual Council occurred at 9 a.m. on Monday, Oct. 16. Following the morning worship, Elder Pierson, with his wife at his

side, announced that "in harmony with medical counsel, we plan to leave Washington for a few weeks' rest and then retire Jan. 3, 1979." The decision, said Elder Pierson, was made after much prayer and agonizing the previous Sabbath morning just before leaving home for Sabbath School. Most of the delegates had not yet heard the news and were genuinely surprised, even shocked. Everyone knew that Elder Pierson would retire in 1980, and many church workers knew of his health problems, but few realized that he was subject to transient ischemic attacks (TIA) that brought numbness to his left side. Only immediate relief from his heavy responsibilities could reduce the high risk of stroke.

This is not the time to evaluate the man, R. H. Pierson, or his administration. This needs to be done carefully and perceptively. Perhaps a church historian will accept this challenge and give us an analytical biography or at least an article in SPECTRUM or *Adventist Heritage* in the near future. The man deserves the full treatment of scholars, for he is undoubtedly the most prominent Adventist of our day and the one who has had the greatest influence on this generation of Adventists.

"Church leaders interpreted and applied the writings of Ellen White in administrative areas more freely than they allow scholars to interpret and apply them in scientific, historical or theological areas."

The twin commitments of the Pierson years were reemphasized in Elder Pierson's final appeal: preservation of traditional Adventism and the evangelization of the world. Many of the delegates considered him their personal friend. He has always had the ability to remember people as individuals and show a personal interest in them and their families.

However, in significant respects, Elder Pierson's analysis of the North American Adventist Church of 1978 is inaccurate. In his final appeal, Elder Pierson used as his text a long quotation taken from Elder and Mrs. Ralph Neall, based on the original paradigm of church evolution by Ernst Troeltsch. "A sect," said Elder Pierson,

> is often begun by a charismatic leader with tremendous drive and commitment. . . it arises as a protest against worldliness and formalism in a church. . . . The group has strict standards and controls on behavior. . . . And then it passes on to the second generation. . . .Children born into the movement do not have to make personal decisions to join it. . . . Preachers arise more by selection and by apprenticeship to older workers than by direct inner compulsion. In the third generation, organization develops and institutions are established. The need is seen for schools to pass on the faith of the fathers. Colleges are established. . . . Youth question why they are different from others, and intermarry with those not of their faith. In the fourth generation there is much machinery; the number of administrators increases while the number of workers at the grassroots level becomes proportionately less. Great church councils are held to define doctrine. More schools, universities and seminaries are established. These go to the world for accreditation and tend to become secularized. There is a reexamination of positions and modernizing of methods. Attention is given to contemporary culture, with an interest in the arts: music, architecture, literature. The movement seeks to become "relevant" to contemporary society by becoming involved with popular causes. Services become formal. The group enjoys complete acceptance by the world. The sect has become a church!

Then, in his own words, Elder Pierson passionately pleaded: "Brethren and sisters, this must never happen to the Seventh-day Adventist Church. This will not happen to the Seventh-day Adventist Church. This is not just another church — it is God's church!"

No careful observer of contemporary

American Adventism can doubt that much of this has already happened. Even the agenda of this Annual Council with so much attention given to adminstrative structure, the wage scale and the retirement plan is evidence that the sect has become a church. The challenge to Adventism is not to resist the evolution from sect to church; such a change has already happened. The challenge is to retain the spark, commitment and message that gave the sect its original power, while accepting the institutional, structural and cultural changes that are the inevitable concomitant of growth in the real world. While it is appropriate, indeed obligatory, to oppose heresy, loss of commitment and abandonment of moral standards, it is futile to oppose change and attempt to exist outside the reality of contemporary culture.

The only question remaining after the delegates absorbed the shock of Elder Pierson's resignation was whether a successor would be elected immediately or later in the year when more overseas delegates could be present. Everyone knew that Elder Neal Wilson would succeed Elder Pierson, but was it worth an additional $100,000 in travel expenses to bring in more overseas representatives and follow the 1975 Annual Council action that provided for the election of a General Conference president between General Conference sessions? Would the overseas church feel left out of this important decision if the Annual Council went ahead and elected Elder Pierson's successor? PREXAD determined that it was more important to save the money, especially since some overseas workers would not be able to obtain visas at any time in the near future, and go ahead with as much advice as possible from overseas delegates present. Accordingly, the council amended the 1975 action so that they could proceed to elect a president. The council also accepted PREXAD's recommendation that PREXAD and the division presidents serve as an ad hoc committee to nominate a special nominating committee to nominate a new General Conference president.

According to the amendment establishing the procedure for electing a president at the time of an Annual Council, specific provision was made that "persons elected at a General Conference Session to the offices they hold will be eligible to serve on this nominating committee." This significant statement made it possible for division and General Conference officers, who are usually excluded from participation on the nominating committee, to dominate it. No one was surprised when the ad hoc committee brought in its report Tuesday morning following the morning worship. The 66 members of the special nominating committee included the overseas division presidents and secretaries, and a few other overseas workers who happened to be attending the Annual Council, the General Conference secretary, treasurer, vice presidents and a select group of other General Conference administrators and departmental representatives, the union conference presidents, the presidents of Loma Linda University, Andrews University, Oakwood College and the General Conference Radio-TV Center at Thousand Oaks. This nominating committee, unlike nominating committees at General Conference sessions, was the church's power elite.

The nominating committee began its work immediately. It was later learned that

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on the first ballot 61 of the 64 votes cast were for Elder Wilson. At three o'clock, the special nominating committee chairman, Cree Sandefur, president of the Pacific Union, and secretary, Calvin Rock, president of Oakwood College, brought the report to the floor. Neal Wilson was placed in official nomination before the body and was unani-

mously and enthusiastically elected president of the General Conference. No one seemed to doubt that Elder Wilson would have been elected regardless of the composition of the nominating committee and with or without extensive representation from the overseas divisions. He is almost universally acknowledged to be the best qualified man for the job.

The 1978 council did not, in the end, make any decision that will change significantly the life of the church. The request for black unions in the North American Division was rejected and the changes in the hospital wage scale will affect very few church workers and have no impact on any church activity. The resignation of Elder Pierson and the election of Elder Wilson, though unexpected at this time, only accelerated a change which would undoubtedly have taken place in Dallas in 1980. Still, the 1978 Annual Council will always be unique as the first one to elect a president of the General Conference.

Seventh-day Adventist Professional Organizations

by Jocelyn Fay

More than 20 professional organizations exist within the Seventh-day Adventist Church in North America, publishing at least 18 journals or newsletters. The societies drawn from the medical professions comprise the oldest and largest Adventist professional organizations. The first professional association to be organized (1932) and presently the largest by far (4,931 members) is the Loma Linda University School of Medicine Alumni, which draws together Adventist physicians. The second oldest is the National Association of Seventh-day Adventist Dentists, organized in 1943, and instrumental in establishing the denomination's School of Dentistry at Loma Linda. Although it did not organize until 1967, the Association of Seventh-day Adventist Nurses has the second largest membership (2,200 members). Many may be surprised to learn that the Public Health Association of Seventh-day Adventists, organized in 1966, has 700 members, 250 more than the dental association.

Several associations were organized in the 1960s, but almost half of those listed below have come into existence in the 1970s. Some of the organizations are so closely integrated into the denominational structure that the church employs personnel to conduct much, if not all, of their business: Academy of Adventist Ministers, Association of Privately Owned Seventh-day Adventist Services and Industries and the Association of Seventh-day Adventist Educators. The Seventh-day Adventist Hospital Association is limited to institutions owned and operated by the church.

Only professional organizations, not social or recreational associations, have been included. The list has also been confined to organizations that are national or international in scope. We have not included, for example, organizations of Adventist lawyers in the Southern and Lake Union Conferences. No organization of Adventist lawyers exists on the national level. We also have not included the Association of Western Adventist Historians, although they are an active group which meets annually at one of the west coast colleges.

Other professional groups are interested in forming organizations. The Adventist teachers in college and university departments of religion and theology at the 1977 meeting of the American Academy of Religion/Society of Biblical Literature seriously discussed forming an association, but agreed to requests from the General Confer-

Jocelyn Fay, a graduate of Atlantic Union College, is the assistant editor of the *Adventist Review*.

ence to postpone organizing for at least a year. The nurse anesthetists are considering forming an association as well. Persons who are interested should write to Arthur N. Norcliffe, Loma Linda University, Loma Linda, California 92354.

Although information has been provided for all the professional organizations about which facts could be found, there are, no doubt, other groups that should have been included. As much as possible, comparable information has been provided for all the associations. Obviously, in some cases only the facts available could be included. This directory, though, should be the start of a fuller awareness that such organizations exist. SPECTRUM is interested in keeping up with the activities of all these organizations and would appreciate receiving information about activities of existing organizations, news from groups inadverdently omitted from this directory, and facts about new societies considering organization.

AVIATION

Adventist Aviation Association

Executive Director: Bill Smith
Andrews University
Berrien Springs, MI 49104

In process of reorganization.

BEHAVIORAL SCIENTISTS

Association of Adventist Behavioral Scientists

President: Adrian Zytkoskee

Office address: P.O. Box 876
Loma Linda, CA 92354

Established: 1976

Number of members: More than 120

Membership requirements:

Full member: Graduate degree in one of the behavioral sciences or related fields, or professional practice in such field. (The association includes the following as behavioral sciences: anthropology, psychology, sociology, psychiatry and social work.) Fee: $10.

Associate member: Persons interested in or involved in the behavioral sciences in a professional way, but without a graduate degree in such a field. Fee: $3.00.

Student member: Undergraduate or graduate students actively pursuing a degree in one of the behavioral sciences. Fee: $2.50.

Overseas member: Professionally trained behavioral scientist residents outside North America who do not opt for regular (full) membership. Fee: $3.00.

Institutional memberships in which SDA colleges or departments help support the association. Fee: $25 for a department, $100 for a college, $150 for a university.

Purpose: To promote intellectual and spiritual growth among SDA behavioral scientists through professional meetings, workshops and publications; and to assist the church in its discharge of its worldwide evangelistic responsibilities.

Publications: Newsletter, *The Adventist Behavioral Scientist,* published twice a year and sent to all members; *The Journal of the Association of Adventist Behavioral Scientists,* published twice a year and sent to full members. Other members may order copies of the journal at the cost of publication plus postage.

BUSINESS EDUCATORS

Seventh-day Adventist Business Education Association

President: Rosa Banks
Oakwood College
Huntsville, AL 35806

Established: 1972

Number of members: 33

Membership: Educators in Seventh-day Adventist secondary schools, colleges and universities whose responsibilities include areas of training in secretarial/business education who have paid the national and district dues as required by the bylaws; and Seventh-day Adventist teachers not currently employed in SDA schools whose primary professional interest is in secretarial/business education who have paid the national and district dues as required by the bylaws.

Membership fee: $10.00 a year

Purpose: To open channels of communication among SDA secretarial/business education teachers for mutual assistance and the disseminating of professional information; to foster and promote professional excellence; to stimulate research in secretarial/business education; to actively recruit personnel for office work; to encourage and work with denominational business educators and office workers in setting up an organization to elevate the standards of the secretarial profession by uniting for their mutual benefit persons who are or have been engaged in denominational office work; to promote the organization of local chapters for secretaries.

Publications: *News and Views,* published November 15 and March 15 each year.

CHAPLAINS

Chaplains' Division of the
Seventh-day Adventist Hospital Association

President: Chaplain E. E. Christian
Porter Memorial Hospital
2525 South Downing Street
Denver, CO 80210

Established: 1967 nationally; East and West Coast Divisions had been functioning earlier.

Number of members: 211

Membership: Institutional membership for Seventh-day Adventist persons engaged in church service who are duly recognized by the church in performing that service. Certified membership for Seventh-day Adventist persons who have been certified by the College of Chaplains of the American Protestant Hospital Association.

Membership fee: None

Purpose: "To foster the highest standards of ministry of making men whole, bringing them into a healing, saving relationship with God and their fellowmen."

Publication: *The Adventist Chaplain,* published quarterly.

CHURCH MUSICIANS

Seventh-day Adventist Church Musicians' Guild

President: Albert E. Mayes, Jr.
9511 Hatillo Avenue
Chatsworth, CA 91311

Local chapters in southern California, Michigan, New York City, Washington, D.C. and Frederick, Maryland.

Established: 1976

Number of members: Approximately 200

Membership: Persons interested in Seventh-day Adventist Church music.

Membership fee: Approximately $5.00; varies from chapter to chapter.

Purpose: To upgrade the music in the Seventh-day Adventist Church.

Publication: *The Score,* published quarterly.

DENTISTS

National Association of
Seventh-day Adventist Dentists

President: Eldon C. Dickinson, D.D.S.

Office: Box 101, Loma Linda, CA 92354

Established: 1943

Number of members: 450

Membership: Graduates of an accredited dental school and members of the Seventh-day Adventist church.

Membership fee: $25

Purpose: To support Adventist dental clinics around the world and provide fraternal fellowship among Adventist dentists.

Publication: *NASDAD News,* published quarterly.

DIETITIANS AND NUTRITIONISTS

Seventh-day Adventist Dietetic Association

President: Patricia B. Mutch, Ph.D., R.D.
Home Economics Department
Andrews University
Berrien Springs, MI 49104

Office Address: P.O. Box 75
Loma Linda, CA 92354

Established: 1954

Number of members: 250

Membership: Seventh-day Adventist registered dietitians and nutritionists. Other Seventh-day Adventists who have suitable academic training in the field of nutrition and/or home economics and who have successful experience in college teaching of foods and nutrition or in administering a food service are eligible for associate membership. Membership is by application, through which professional eligibility is determined.

Membership fee: $10 a year; less for students

Purpose: To assist its members in enhancing their professional contribution as leaders in food administration, clinical dietetics and nutrition education in church-related medical and educational institutions; and to make more effective the participation of its members in the health ministry of the church.

Publication: Newsletter, *SDADA News,* published six times a year. Subscription price: $4.00.

EDUCATORS

Association of Seventh-day Advenitst Educators

President: Richard T. Orrison
Andrews University
Berrien Springs, MI 49104

Executive Secretary: Walton J. Brown
Education Director
General Conference of SDA
6840 Eastern Avenue, N.W.
Washington, D.C. 20012

Established: 1970

Number of members: approximately 800

Membership: Regular: SDA personnel who have the baccalaureate degree equivalent, or who hold SDA educational credentials, and who constitute the faculty, staff and administration of Seventh-day Adventist institutions, whether in early childhood, elementary, secondary or higher education; SDA educators who are teaching in public, government or private schools; SDA graduate students; individuals sponsored by the General Conference Committee; retired SDA educators.

Associate: SDA undergraduate students; paraprofessional personnel

Membership fee: $1.00 annually, payable October 1

Purpose: To promote and encourage the ideals and principles of Christian education; to seek to maintain Christian education on a high spiritual and professional level; to strive toward a goal of moral and professional excellence; to interpret Christian education within the overall objectives of the Seventh-day Adventist Church; to explore and make known to the members of the association methods and materials for improvement and growth; to foster cooperation nationally and internationally between and among professional educators.

Publication: *Journal of Adventist Education.*

ENGINEERS AND ARCHITECTS

Association of Adventist Engineers and Architects

President: David Hensel
Association of Adventist Engineers and Architects
P.O. Box 25
College Place, WA 99324
Phone: (509) 527-2766

Number of members: 150

Membership: Adventist engineers, architects or craftmen in associated fields.

Membership fee: $5.00 application fee, $15 annual dues

Purpose: To aid the church in its objectives by the use of these professional people.

Publication: *Adventist Engineer,* published quarterly in conjunction with the educational paper of the Walla Walla College School of Engineering.

ENGLISH TEACHERS

Association of Adventist English Teachers

President: Minon Hamm
Southern Missionary College
Collegedale, TN 37315

Membership: Members of departments of English in Adventist colleges and academies in North America.

Purpose: To determine goals and objectives for Adventist English teachers, to share material, techniques, experience, research with other English professionals in the Adventist circle, to disseminate our ideals and objectives to Adventists outside our profession.

Meetings: At NADHEC sessions and either the MLA annual meetings or NCTE meetings.

Publication: *The Adventist English Newsletter,* quarterly
Editor, Beverly Beem, Walla Walla College.

HISTORIANS

Association of Seventh-day Adventist Historians

President: Erwin Sicher
Southwestern Adventist College
Keene, TX 76059

Established: 1973

Number of members: approximately 80

Membership: Those who are interested in the organization and who accept its objectives.

Membership fee: $2.50 annually

Purpose: To provide intellectual and social fellowship among its members; encourage scholarly pursuits in all the historical disciplines; identify Seventh-day Adventist teachers of history both within and without the church's educational system as well as researchers and graduate students working in historical fields; acquaint others with the members' contributions as historians.

Publications: Newsletter and directory; is one of the organizations sponsoring *Adventist Heritage,* a magazine of denominational history.

HOSPITALS

Seventh-day Adventist Hospital Association

President: D. R. Ammon, Administrator
Portland Adventist Medical Center
10123 S.E. Market Street
Portland, OR 97216
Phone: (503) 257-2500

Established: 1960

Number of members: 45-50 hospitals

Membership: Institutional rather than individual. Membership is limited to hospitals owned and operated by the church, and participation is by members of the administrative staff of member institutions.

The Hospital Association also has a number of

subsidiary, affiliated groups in various technical and professional areas. These groups, in turn, meet in conjunction with the annual meetings in their own specialty field, but function as subsidiaries of the parent association, which each year names administrators to serve as the liaison with these groups. They include chaplains, personnel administrators, radiological technicians, financial administrators, personnel directors, pharmacists, respiratory therapists, medical technologists and directors of social services.

Membership fee: Based on a formula related to the number of occupied beds.

Purpose: The organization is sponsored by the General Conference and was established to strengthen and advance the work of SDA hospitals in the North American Division. It is advisory, not policy making, in function.

HOME ECONOMISTS

Home Economics Association of Seventh-day Adventists

President: Martha Lorenz
Department of Home Economics
Andrews University
Berrien Springs, MI 49104

Established: 1976

Number of members: 25

Membership: Regular (voting) membership open to Seventh-day Adventists with a bachelor's, master's or doctor's degree in some area of home economics; or Seventh-day Adventists with a bachelor's, master's or doctor's degree in a field related to home economics plus a minimum of two years' experience in home economics-related professional activities; or Seventh-day Adventist graduate students in home economics. Associate (nonvoting) membership open to Seventh-day Adventist undergraduate students majoring in home economics or paraprofessional men and women in home economics services.

Membership fee: $5.00 per year

Purpose: To promote the ideals and principles of professional home economics to serve families and individuals; to seek to maintain Christian education for family life on a high spiritual and professional level; to strive toward a goal of moral and professional excellence; to interpret the goals of professional home economics within the overall objectives of the Seventh-day Adventist Church; to explore and make known to the members of the association methods and materials for growth and improvement as professional home economists; and to foster cooperation nationally and internationally between and among professional Seventh-day Adventist home economists.

Publication: *HEASDA Newsletter,* published each spring and fall.

MINISTERS

Academy of Adventist Ministers

President: Daniel A. Skoretz
Ministerial Association
General Conference of SDA
6840 Eastern Avenue, N.W.
Washington, D.C. 20012

Established: 1972

Number of members: approximately 600

Membership: Ministers of the Seventh-day Adventist Church through payment of a yearly membership fee and by providing evidence of a minimum of 50 clock hours per year of study that provides some measurable results.

Membership fee: $15 annually

Purpose: To encourage the pastor to keep abreast of the very latest and best information essential to his leadership growth.

Publication: None.

NURSES

Association of Seventh-day Adventist Nurses

President: Maxine Blome
Portland Adventist Medical Center
10123 S.E. Market
Portland, OR 97216

Established: 1967

Number of members: 2,200 (North America)

Membership: Currently licensed registered nurses or licensed practical nurses who are members of the Seventh-day Adventist Church.

Membership fee: $15 annually

Purpose: To keep their mission before SDA nurses, to promote the ideals and principles of SDA nursing, to encourage SDA young people to enter the nursing profession, to keep members informed as to the need for SDA nurses in denominational work and other places, to encourage practicing nurses to give spiritual assistance to patients while caring for their physical needs according to the instructions and teachings of the denomination, and to advance the standards of SDA nurses and nursing, the care of the sick, and the honor and character of the nursing profession.

Publication: *Forum,* published quarterly.

OPTOMETRISTS

Association of Seventh-day Adventist Optometrists

President: Harry Oster
P.O. Box 1648
Omak, WA 98841

Address inquiries to: Fred Wright, Secretary
Association of SDA Optometrists
115 North Main Street
Sweetwater, TN 37874

Established: 1958

Number of members: 65

Membership: Seventh-day Adventists who are members of the American Optometric Association.

Membership fee: None

Purpose: To promote the role of the Adventist optometrist at home and in overseas mission service, and to promote a greater interest in the field of optometry.

Publication: Newsletter.

OSTEOPATHS

National Association of Seventh-day Adventist Osteopaths

President: Gordon P. Guild, D.O.
National Association of SDA Osteopaths
33 Peach Grove Avenue
Centerville, OH 45459

Established: 1966

Number of members: 200

Membership: Seventh-day Adventist doctors of osteopathy.

Purpose: To promote Christian medicine with osteopathic concepts.

Publication: Monthly paper, *NASDAO.*

PERSONNEL MANAGERS

Hospital Personnel Management Association
(Division of the Seventh-day Adventist Hospital Association)

President: Richard U. Fuss
Paradise Valley Hospital
2400 East Fourth Street
National City, CA 92050

Established: 1968

Number of members: 86

Membership: Seventh-day Adventist hospital personnel directors or administrators who are also in charge of personnel functions.

Membership fee: None

Purpose: To foster the highest standard of personnel administration; to coordinate the personnel policies and functions of all the institutions in the association; to develop a system whereby each member may be aware of the needs of other institutions in the association; and to promote health-related careers among Seventh-day Adventists.

Publication: *News and Views,* published monthly.

PHYSICIANS

Adventist International Medical Society

President: Carl Bauer, M.D.

Office: 11188 Anderson Street
Loma Linda, CA 92354

Established: 1977

Number of members: 100

Membership: Adventist physicians.

Membership fee: $100

Purpose: To foster medical missions and fraternal bonds among Adventist physicians.

Publication: *Journal of World Missions,* forthcoming, monthly.

* * *

Alumni Association of the Loma Linda University School of Medicine

President: Joan Coggin, M.D.

Office: 11188 Anderson Street
Loma Linda, CA 92354

Established: 1932

Number of members: 4,931

Membership: Graduates of the Loma Linda University School of Medicine.

Membership fee: $70

Meetings: Once a year at Loma Linda University

Publications: *Alumni Journal,* published six times a year; *Alumni Directory,* published once a year.

PUBLIC HEALTH

Public Health Association of Seventh-day Adventists

President: Joel Haas
Great Lakes Adventist Health Services, Inc.
34 South Vine Street
Hinsdale, IL 60521
Phone: (312) 920-1100

Established: 1966

Number of members: 700

Membership: Consists of nine classes — regular, affiliate, associate, student, missionary, military, sponsorship, institutional and life.

Membership fee: $6.50

Purpose: The primary purpose of PHASDA is to bring together all professionals and those interested in the health ministries of the church whether they be professionals or lay persons, to discuss the church's health ministries and to plan and carry on an educational program for members and nonmembers of their churches.

Publication: None.

PUBLIC RELATIONS

Adventist College Public Relations Alumni and Development Association

President: Donald G. Prior
Vice-president for Public Relations and Development
Loma Linda University
Loma Linda, CA 92354

Established: 1976

Number of members: about 35

Membership: Automatic membership for all public relations, development, alumni and recruitment personnel in Adventist colleges and universities in North America.

Membership fee: None

Purpose: To exchange information and ideas.

Publication: None

Meets each July in connection with the National Council for the Advancement and Support of Education meeting.

SERVICES AND INDUSTRIES

Association of Privately Owned Seventh-day Adventist Services and Industries

Executive Secretary: J. J. Aitken
General Conference of SDA
6840 Eastern Avenue, N.W.
Washington, D.C. 20012

Established: 1947, reorganized 1951

Number of members: more than 500

Membership: Institutions and personal enterprises operated by SDA church members in harmony with denominational standards and principles, and according to professional and ethical standards; in business for at least one year; and recommended by local and union conference administrations and their ASI secretaries and local pastors.

Membership fee: personal — $15 annually; family — $20 annually; self-supporting schools and businesses with 2 to 9 employees — $25 annually; with 10-25 employees — $35 annually; with more than 25 employees — $50 annually

Purpose: For the promotion of the interests of SDA privately owned and operated self-supporting enterprises in North America.

Publication: *ASI News,* free to members, $5.00 annually for nonmembers.

SOCIAL WORKERS

Association of Seventh-day Adventist Social Workers

President: June Horsley
Box 377
Loma Linda, CA 92354

Members voted recently not to continue with a national organization. They are in the process of reorganizing into local groups.

SPEECH PATHOLOGISTS AND AUDIOLOGISTS

Speech and Hearing Association of Seventh-day Adventists

President: Roy Hartbauer
6756 South Highfield Drive
Oak Creek, WI 53154

Established: 1972

Number of members: Averages between 100 and 125

Membership: Professionals and students in speech pathology and audiology.

Membership fee: $5.00 regular, $2.00 student, annually

Purpose: To contribute to the evangelistic outreach of the church among the handicapped, to provide information about training programs to interested students, to provide information to denominational institutions about qualified professionals available for employment, to encourage and devise ways to extend services to language, speech and hearing handicapped Adventist members and their families, and to provide Christian fellowship for Adventist students majoring in these professions at nondenominational schools.

Publication: *Shasda Report,* published biannually.

'Sciences of Satanic Origin': Adventist Attitudes Toward Evolutionary Biology and Geology

by Ronald L. Numbers

"Again and again we shall be called to meet the influence of men who are studying sciences of satanic origin, through which Satan is working to make a nonentity of God and of Christ." Ellen G. White, *Testimony for the Church,* No. 37.

" . . . there ought to be no doubt whatever that the popular forms of geology and paleontology should be included as 'sciences of satanic origin.' " George McCready Price, *Theories of Satanic Origin.*

The birth of Seventh-day Adventism coincided with the opening of the nineteenth-century debate over evolution. In 1844, the year of the Great Disappointment, the Scottish author and publisher Robert Chambers anonymously published his *Vestiges of the Natural History of Creation,* the book that first brought the subject of evolution to the attention of the American reading public. Fifteen years later, on the eve of denominational organization, Charles Darwin brought out his monumental *Origin of Species.* For most American Christians, including many evangelicals, the crucial issue raised by Darwin concerned the argument from design: did evolution by natural selection negate the view of a divinely planned world? Relatively few Americans publicly expressed concern about the impact of Darwinism on the Genesis story of creation, which most observers regarded as being sufficiently vague to accommodate developmental views requiring periods of time well in excess of 6,000 years.[1] Adventists, however, staunchly defended both the historical and scientific accuracy of the first chapters of Genesis.

By far the most influential early Adventist was Ellen G. White, whose visions and testimonies molded the sect's thinking on matters ranging from diet to eschatology. Like her fellow believers, few of whom had been exposed to the influence of higher education, Mrs. White consistently subordinated science to the Scriptures. "The Bible is not to be tested by men's ideas of science," she wrote, "but science is to be brought to the test of this

Ronald L. Numbers, chairman of the department of the history of medicine, University of Wisconsin, is the author of *Creation by Natural Law* (Univ. of Washington Press) and *Almost Persuaded* (Johns Hopkins Press).

unerring standard." Since Moses had written his account of creation "under the guidance of the Spirit of God," any theory contradicting it was to be rejected out of hand. So far as she was concerned, Moses had left no doubt that the days of creation were six in number and of 24 hours' duration, and that the mode of creation had not involved the use of natural laws.[2]

The editors of the *Review and Herald* shared Mrs. White's views on the relationship between science and religion. Early in 1859, several months before the publication of the *Origin of Species,* they reprinted an excerpt from a non-Adventist source claiming that "while the Bible does not teach science, when it does refer to science it is always correct."[3] This theme appeared frequently in early Adventist literature.

One of the few warnings against an unreasoning dependence on the Bible in matters of science came from a member of the small educated minority in the church, a physician named John Harvey Kellogg, recently graduated from the Bellevue Hospital Medical College in New York City and serving as professor of physics in the denomination's newly founded Battle Creek College. Writing in 1879 in a small volume entitled *Harmony of Science and the Bible,* Kellogg listed as one of the chief factors responsible for the recurring conflict between religion and science the habit of religionists of "holding the Bible as unimpeachable authority on *all* subjects, as the universal test of truth, and attaching all importance to a particular interpretation of its language." Though Kellogg apparently believed in a special creation, he expressed a willingness to recognize the legitimacy of science within its own sphere. "Science deals chiefly with one sort of truths, religion with another class of truths." If only this division were honored, he thought all conflict would cease.[4] In an article in the *Health Reformer* in 1874, he called for a "careful scrutiny of the arguments" in favor of evolution and an end to jeers and sneers. While adhering to the special creation of species in the beginning, he conceded that much of Darwin's theory was based on "indisputable" facts.[5]

"Adventists placed their faith in the Bible rather than science because of a deep suspicion of human reason, and nothing seemed to confirm this suspicion better than the science of geology. . . ."

Adventists placed their faith in the Bible rather than science because of a deep suspicion of human reason, and nothing seemed to confirm this suspicion better than the science of geology, which depended so crucially on the *assumption* of uniformity. Thus, while the leaders of American thought were discussing the merits of biological evolution, Adventists were often preoccupied with the real or imagined fallacies of geology, which they saw as providing a foundation for organic evolution — both theories going "hand in hand to destroy faith in the word of God."[6] Seldom did they miss an opportunity to point a scoffing finger at "the dreamy, incoherent utterances of geologists."[7] Uriah Smith, editor of the *Review and Herald,* occasionally led the attack himself. Though he had never attended college, he had no fear of doing battle with the Goliaths of the scientific world. Who, he asked, had "ever proven or tried to prove" the validity of the uniformity principle? "Nobody," he answered. "Usually it is either 'presumed that the reader will be convinced' of the matter, or certain results are 'supposed to have been effected by such causes as are operating at present.' "[8]

From time to time, Smith opened the pages of the *Review and Herald* to other critics of geology. Their titles alone adequately reveal their message: "The Blunders of Geologists," "The Uncertainty of Geological Science" and "False Theories of Geologists."[9] Typical was the comment of George W. Amadon, the 28-year-old editor of the *Youth's Instructor,* a periodical for Adventist young people. "No class of scientific men are more hasty and rash in making asser-

tions than some geologists," he wrote. "As a science it is not demonstrative, and its oracles are contradictory and clash with each other."[10]

Smith and his colleagues regularly reprinted what they considered to be devastating examples of the "extravagant pretensions" and the "absurdity" of geology. In one of these, a Reformed Presbyterian minister in Chicago, Robert Patterson, remarked that to construct the earth's history from processes currently observable was like measuring "a youth of six feet high, and finding that he grew half an inch last year, [concluding] thence that he was a hundred and forty-four years old."[11] In another, President Joseph F. Tuttle of Wabash College was said to have scored "a capital hit on that popular farce and prime minister of skepticism, geological guess-work," when he suggested that fossils — particularly human ones — found in geological formations much lower and earlier than usually assigned to men had probably dropped to that level during earthquakes.[12]

Among the sizable group of Adventists to comment on geology, not one had any firsthand acquaintance with the science and few gave any evidence that they had read more than popular accounts of what geologists did. A notable exception was Elder Alonzo T. Jones, a self-taught ex-soldier converted while stationed at Fort Walla Walla, Wash. Unlike many of his colleagues, Jones took geology seriously enough to read Archibald Geikie's *Textbook of Geology,* one of the most authoritative works in the field, three times through. All this study, however, merely convinced him of the total unreliability of geology, a theme he developed at length in a series of lead articles for the *Review and Herald* in 1883.[13] Here he accused geologists not only of beginning their reasonings with an assumption, but also of using circular arguments. The most blatant instances of the latter, he thought, were two statements by Geikie on dating. "One of these says that the *relative age of the rocks* is determined *by the fossils.* The other says that the *relative age of the fossils* is determined *by the rocks*." "What is this but reasoning in a circle?" asked Jones. This example and others like it forced him to conclude that "the only *certain* thing about [geological science], is its *uncertainty*."[14]

Most Adventists understandably refused to admit harboring any hostility toward what they liked to call "true science," that is, science based upon "facts" and in agreement with the Bible. They directed their criticism solely at "science falsely so-called," hypothetical science in conflict with revelation.[15] Scientific theories and hypotheses regarding the history of the earth were acceptable only under the severest restrictions. In formulating them, scientists were not to "assume any condition of the world, the existence of any agents, or the occurrence of any events, the reality of which they cannot demonstrate; and all their assumptions and reasonings must be consistent with all the facts, and all the laws of nature, which the question affects."[16] It did not disturb Adventists that these stipulations also ruled out as unscientific all supernatural explanations of the creation of the world. They happily transferred the entire question of origins from the sphere of science to the realm of faith.[17]

In defending their extreme Baconian view of science, many Adventists revealed an anti-intellectual prejudice, not uncommon among Americans with little education. In 1872, the *Review and Herald* reprinted an address by the Presbyterian minister John Hall, in which he warmly thanked scientists for collecting so many useful facts, then denied them an exclusive right to interpret what they had discovered. "When they come to reason upon these facts," he said,

> they use just the same kind of mind that God has given me; and I endeavor to use my mind upon these facts aright, just as truly as they claim to use their minds upon the facts. Hence. . . I claim the right to reason upon them just as truly as they can claim it; and I do not think the less of myself if in many instances I draw conclusions from the facts that have thus become common property that are not the conclusions that they venture to draw![18]

Most Adventists could not have agreed more.[19]

Adventist opposition to developmental

theories, both organic and inorganic, focused not on the uncertain status of these ideas but on their apparent conflict with revelation. The Bible clearly stated that God made the world in "six natural days," and Adventists rebelled at the thought of sacrificing this divine truth "on the altar of geological speculation." Few spelled out the implications of such a sacrifice more sharply than David Nevins Lord, a New York millenarian and former editor of the *Theological and Literary Journal*. Genesis and geology, he asserted, are mutually contradictory. If the geologists are correct, the Mosaic record is false and God is a liar. And "it is impossible that God should not have spoken the truth." The decision to accept or reject geology thus took on tremendous theological significance. "If founded on just grounds, [geology] disproves the inspiration, not only to the record in Genesis of the creation, but of the whole of the writings of Moses, and thence, . . . of the whole of the Old and New Testaments, and divests Christianity itself of its title to be received as a divine institution."[20]

Compounding the difficulty of harmonizing any developmental view with the Bible were the statements of Ellen White. Writing in *Spiritual Gifts* in 1864, she claimed to have seen in vision the actual creation of the world. Specifically, she saw "that the first week, in which God performed the work of creation in six days and rested on the seventh day, was just like every other week."[21] For many Adventists, the rejection of her testimony would have been tantamount to repudiating God's own word.

Adventists especially feared anything that might weaken their arguments for observing the seventh-day Sabbath as a memorial of creation. And theories of evolutionary development threatened to do just that. According to Ellen White, "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."[22] Her husband, James, president of the General Conference, likewise warned that any deviation from the traditional view of creation would undermine the doctrine of the Sabbath along with the rest of the Bible. If the days of creation were assumed to be long, indefinite stretches of time, then

> the period of man's toils and cares before a day of rest, is also immense, covering millions of years. And if the last day of the first week, the day on which Jehovah rested from his work, was another immense indefinite period, the weekly Sabbath of the Old and New Testaments, which was made for man and commanded in the moral law to be kept holy, is also an immense period of time.

"The fact that theistic evolution had won widespread acceptance in the Christian world. . . carried no weight with Adventists. It was merely additional evidence of the apostasy afflicting the nation's leading churches. . . ."

Such ideas, making the Bible seem absurd, obviously could not be tolerated.[23]

The only accommodation to an expanded timescale Adventists ever entertained was the possibility of allowing an extended period of time between an initial creation of inorganic matter "in the beginning," depicted in the first verse of Genesis 1, and a later six-day creation about 6,000 years ago. In the opinion of at least one Adventist, a midwestern minister named J. P. Henderson, this view did "no violence to a single statement in the Bible."[24] Yet, despite its innocuousness, this compromise never gained much popularity among Adventists until the late 1890s, when both the *Review and Herald* and *Signs of the Times* came out in support of an old-earth theory. Still, the prevailing attitude remained that earlier expressed by J. N. Andrews, who insisted that there was "blank nothing" prior to the week of creation: "Even the materials which subsequently formed the worlds had no existence."[25]

Their strict adherence to a literal reading of Genesis prevented Adventists from adopting even the most theistic of evolutionary ideas and thus separated them from the mainstream of American thought. Well before 1859, educated Americans had reinterpreted Genesis to make room for the advancement of science. During the 1830s and 1840s, Edward Hitchcock of Amherst College influenced many to embrace a view similar to that advocated by Elder Henderson, with the significant difference that Hitchcock's disciples allowed for the appearance of a succession of plants and animals prior to the Mosaic creation. In the following decades, the educated often found it more reasonable to assume that the six days of Moses represented not 24 hour periods, but long intervals, a compromise advocated by scientific notables like Yale's Benjamin Silliman and James Dwight Dana and Princeton's Arnold Guyot.[26] Either of these interpretations permitted the orthodox to adopt a theistic brand of evolution without seeming to depart from the intended revelation.

Adventists also ran counter to prevailing theological currents in America when they insisted upon miraculous special providences as the mode of creation. By the second half of the nineteenth century, the religious leaders of America, including many evangelicals, were placing less emphasis on supernatural interventions in the natural order and more on God's general providence through the secondary laws of nature. Thus, without difficulty, they could explain evolution simply as God's way of creating with natural laws.[27] Adventists, however, saw evolution as restricting, if not altogether abolishing, God's role in the work of creation. It "is the last and most plausible attempt of infidelity to vote the throne of the adorable Creator vacant," wrote one author in the *Review and Herald.*[28] Another described it as "only an attempt to eject God, and to postpone him, and to put him clear out of reach."[29]

Because of the allegedly impious tendencies of evolution, Adventists commonly labeled it "atheistic" or "infidel," and its founders and supporters fared not better. The *Review and Herald,* for example, unapologetically published Thomas Carlyle's description of Darwin as an unintelligent atheist and reprinted a statement that "all the leading scientists who believe in evolution, without one exception the world over, are infidel."[30] The fact that theistic evolution had won widespread acceptance in the Christian world — "almost all-pervading in the orthodox and evangelical churches, schools, and colleges" — carried no weight with Adventists. It was merely additional evidence of the apostasy afflicting the nation's leading churches, explained W. H. Littlejohn, president of Battle Creek College.[34]

Nontheological considerations played a secondary, but significant, role in the Adventist resistance to organic evolution. Human vanity rebelled at the prospect of relinquishing an honored position at the head of created beings only to be herded together "with four-footed beasts and creeping things," over which man had formerly had dominion. Darwinism, complained one unhappy critic, "tears the crown from our heads; it treats us as bastards and not sons, and reveals the degrading fact that man in his best estate — even Mr. Darwin — is but a civilized, dressed up, educated monkey, who has lost his tail."[32] For those who believed they had been created in the image of God himself, the demotion was indeed humiliating.

Those who rejected the evolutionary history of life necessarily had to provide an alternative explanation of the fossil record, and here Adventists invariably turned to the Noachian Flood for virtually all solutions to their geological and paleontological problems. Encouragement to do this came from Ellen White, who wrote that if individuals would only recognize "the size of men, animals and trees before the flood, and . . . the great changes which took place in the earth," they would have no trouble accepting the "view that creation week was only seven literal days, and that the world is now only about six thousand years old." She believed that the recent findings of earth scientists were providential, designed by God to "establish the faith of men in inspired history."[33]

Following her lead, the editors of the *Review and Herald* widely publicized any new discoveries that might conceivably corroborate the occurrence of the flood.

Adventists adopted a similar approach in defending Mrs. White's explanation of the multiplicity of species: amalgamation. According to her,

> Every species of animal which God had created were [sic] preserved in the ark. The confused species which God did not create, which were the result of amalgamation, were destroyed by the flood. Since the flood there has been amalgamation of man and beast, as may be seen in the almost endless varieties of species of animals, and in certain of men.[34]

This statement in *Spiritual Gifts* (1864) — especially the allusion to human races — understandably raised questions in the minds of some readers. Which races of men did Mrs. White have in mind? And did she mean that some races were partially animal? Critics charged her with teaching that Negroes were not members of the human race. But as Uriah Smith pointed out in *The Visions of Mrs. E. G. White* (1869), a book warmly recommended by James White, such accusations were unfair. The mere possession of some animal blood, Smith argued, did not strip one of humanity, because individuals were human if they had "any of the original Adamic blood in their veins." On the other hand, no one familiar with "the wild Bushmen of Africa, some tribes of the Hottentots, and perhaps the Digger Indians of our own country, &c." could reasonably doubt the validity of Mrs. White's view, thought Smith. "Moreover, naturalists affirm that the line of demarkation between the human and animal races is lost in confusion. It is impossible, as they affirm, to tell just where the human ends and the animal begins."[35]

Smith also appealed to contemporary science to corroborate Ellen White's statements about the size of man and animals before the flood. Referring to the recent discovery of what had erroneously been identified as huge human bones, he reported that evidence

> is now almost daily coming up fresh from the bosom of the earth — evidence from the discovery of organic remains, sufficient to show beyond a sane doubt, that at some period in the past there existed on this earth a class of gigantic men and animals, in comparison with which the present species are but pigmies.[36]

Despite their tendency to subordinate science to the Scriptures, Adventists did not hesitate to employ the growing authority of science when it served their purposes.

* * * *

Throughout the nineteenth century, Seventh-day Adventists could turn to no scientists of their own, except for a few physicians. Thus, the appearance of the first Adventist "scientist," George McCready Price, represents a new phase in the history of the denomination's attitudes toward science.

Price was born in eastern Canada in 1870. When his widowed mother joined the Adventist church, he, too, embraced that faith. During the early 1890s, young Price attended Battle Creek College in Michigan for two years and subsequently completed a teacher training course at the provincial normal school in New Brunswick.[37]

The turn of the century found him serving as principal of a small high school in an isolated part of eastern Canada, where one of his few companions was a local physician. The doctor and the teacher enjoyed discussing scientific matters, and the former almost succeeded in making an evolutionist of his fundamentalist friend. On at least three occasions, Price nearly succumbed to evolution, or at least to what he always considered its basic tenet: the progressive nature of the fossil record. Each time he was saved by prayer — and by reading Mrs. White's book *Patriarchs and Prophets*, which attributed the fossil record to the Noachian Flood.[38] As a result of this experience, he decided on a scientific career championing what he called the "new catastrophism," in contrast to the old catastrophism of the French scientist Cuvier.

By 1906, Price was living in southern California and working as a handyman at the Loma Linda Sanitarium. That year he published a slim volume entitled *Illogical Geolo-*

gy: The Weakest Point in the Evolution Theory, in which he confidently offered a $1,000 reward "to any one who will, in the face of the facts here presented, show me how to prove that one kind of fossil is older than another." Essentially, he argued that Darwinism rested "logically and historically on the succession of life idea as taught by geology," and that "if this succession of life is not an actual scientific fact, then Darwinism . . . is a most gigantic hoax."[39] Throughout his life, Price saved his sharpest barbs for uniformitarian geology, since, in his opinion, "the modern theory of evolution is about 95% due to the geology of Lyell and only about 5% to the biology of Darwin."[40]

Readers of Price's book responded in widely divergent, but predictable, ways. The head of a theological seminary in Ohio wrote that he had never read anything clearer and more convincing on the subject,[41] while David Starr Jordan, president of Stanford University and an authority on fossil fishes, told Price frankly that he should not expect "any geologist to take [his work] seriously."

"Despite their tendency to subordinate science to the scriptures, Adventists did not hesitate to employ the growing authority of science when it served their purposes."

Jordan conceded that Price had written "a very clever book," but went on to describe it as "a sort of lawyer's plea, based on scattering mistakes, omissions and exceptions against general truths that anybody familiar with the facts in a general way cannot possibly dispute. It would be just as easy and just as plausible and just as convincing if one should take the facts of European history and attempt to show that all the various events were simultaneous."[42] Jordan's suggestion that Price obtain some "direct contact with problems regarding fossils"[43] penetrated the weakest spot in the creationist's armor: his lack of any formal training or field experience in geology. (Price apparently *observed* field work for the first time at age 63.) Price was, however, a voracious reader of geological literature, an armchair scientist who self-consciously minimized the importance of field experience. "It has long been notorious," he once said, "that field naturalists are often mere children when attempting to handle the larger problems of science." Darwin was an excellent example.[44]

During the next 15 years, Price taught in several Adventist schools and authored six more books attacking evolution, particularly its geological foundation. Although not unknown in fundamentalist circles before the early 1920s, he did not begin attracting widespread national attention until then. Shortly after the fundamentalist controvery entered its anti-evolution phase, Price published his *New Geology,* the most systematic and comprehensive of his two dozen or so books. In it, he restated his "great *law of conformable stratigraphic sequences*. . . by all odds the most important law ever formulated with reference to the order in which the strata occur." According to this law, *"Any kind of fossiliferous beds whatever, 'young' or 'old,' may be found occurring conformably on any other fossiliferous beds, 'older' or 'younger.' "*[45] To Price, so-called "deceptive conformatives" (where strata seem to be missing) and "thrust faults" (where the strata are apparently in the wrong order) proved that there was no natural order to the fossil-bearing rocks, all of which he attributed to the Genesis flood.

Although *The New Geology* pleased many fundamentalists, it scarcely improved Price's reputation among practicing scientists. Charles Schuchert of Yale, in reviewing Price's book in the journal *Science,* accused the creationist not only of "harboring a geological nightmare" but of outright dishonesty in appropriating a number of his illustrations from other authors.[46] (In a heated exchange with the editor of *Science,* Price protested his innocence and threatened to sue for libel, but the affair was never satisfactorily resolved.[47])

Despite attacks from the scientific establishment, Price's influence among non-Adventist fundamentalists grew rapidly. By the mid-1920s, the editor of *Science* could accurately describe Price as "the principal scientific authority of the Fundamentalists,"[48] and Price's byline was appearing with increasing frequency in a broad spectrum of religious periodicals: *The Sunday School Times* and *Moody Monthly* each published about a dozen of his articles, and such diverse journals as *Bibliotheca Sacra, Catholic World, Princeton Theological Review* and *The Bible Champion* eagerly sought his literary services.[49]

Through his numerous articles and books, Price significantly altered the course of fundamentalist thought, slowly but perceptibly steering it in the direction of the traditional Adventist interpretation of Genesis. Prior to the appearance of Price on the fundamentalist scene, many evangelicals had compromised with the teachings of modern science. As late as 1910, for example, the editors of *The Fundamentals,* the series of pamphlets whose publication often marks the beginning of the so-called fundamentalist movement, chose George Frederick Wright, a clergyman-geologist from Oberlin College, to write on evolution and religion. His selection is surprising in retrospect, because Wright was one of the best-known Christian Darwinists in the United States, having long promoted a theistic view of evolution. Although he faithfully defended the Bible's historical accuracy, he saw no conflict between Genesis and geology and no reason to insist on a worldwide flood. It was not until after World War I, when Price emerged as their scientific spokesman, that fundamentalist leaders began insisting on a 6,000-year-old earth and a universal deluge.

On the eve of the Scopes trial in July 1925, in which a high school biology teacher in Dayton, Tenn., was found guilty of violating a state law prohibiting the teaching of evolution in public institutions, the high-priest of fundamentalism, William Jennings Bryan, invited Price to assist the prosecution as an expert witness.[50] Price was a logical choice, being both an acquaintance of Bryan's and the best-known scientist in the fundamentalist camp. Unfortunately, Price was teaching at the time in an Adventist college outside London and could not attend the trial. Instead, he wrote Bryan a letter advising him to avoid any *scientific* arguments and to charge the evolutionists with being un-American for compelling a parent to pay taxes "to have his child taught something that he utterly repudiates and considers anti-Christian."[51]

At one point during the epic trial, Clarence Darrow asked Bryan if he respected *any* scientist. When Bryan named Price, Darrow scoffed: "You mentioned Price because he is the only human being in the world so far as you know that signs his name as a geologist that believes like you do. . . every scientist in this country knows [he] is a mountebank and a pretender and not a geologist at all." Eventually, Darrow browbeat the broken old man into conceding that the world was indeed more than 6,000 years old and that the six days of creation had probably been longer than 24 hours each — departures from strict fundamentalism that Price never forgave.[52]

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While Bryan and Darrow matched wits in Tennessee, Price busily prepared for a showdown in London with Joseph McCabe, a prominent evolutionist and former Jesuit. The debate, held September 6 in Queen's Hall, was by all accounts a fiasco. Shortly after the event, Price complained to a friend in the United States that "during my last 15 minutes I was heckled and interrupted a great deal, and was not permitted to finish as I might have done. At one time, I suppose a thousand people were on their feet at once,

yelling and arguing with me or with their next-seat neighbours. It was a lively time."[53] The *New York Times* reported that "interruptions became so frequent that half the audience seemed to be on their feet arguing among themselves. One young woman. . . shouted so determinedly at [Price] that at last he sat down." After such harsh treatment, it is perhaps understandable why Price thought the English were "prejudiced" against him and his views.[54]

His experience at the conservative Victoria Institute in London did little to change his mind. Although the Institute awarded him its Langhorne-Orchard Prize in 1925, for an essay on "Revelation and Evolution," many members resented the North American's attempt to export the fundamentalist controversy to England, where science and religion were coexisting in relative harmony. One of the Institute's scientists sharply rebuked Price for attempting "to drive a wedge between Christians and scientists," as had been done in America. The editor of the Institute's transactions advised his colleagues that it would be foolish for British Christians to launch a new crusade against evolution simply because Price thought they should. After all, even a literal reading of the first verses of Genesis provided ample opportunity for accommodating long-term geological developments.[55]

Late in 1928, as the fires of fundamentalism burned dim, Price returned to the United States. He continued to preach his "new catastrophism," but came to realize by the late 1930s that he was fighting for a lost cause. Not only was the public losing interest in his crusade, but even his own students were beginning to defect. The most traumatic defection was that of Harold W. Clark, who had studied with Price in 1920 and then succeeded him as professor of geology at Pacific Union College in northern California. Later, Clark earned a master's degree in biology from the University of California.

In his early scientific writings, like *Back to Creationism* (1929), Clark followed his mentor closely, but the more he observed, the more he questioned Price's views. Eventually, he broke with Price on three major points: glaciation, stratification and tectonics.[56] Beginning with the summer of 1929, Clark devoted his vacations to studying glaciation in the mountains of the West, and the evidence he saw convinced him that, contrary to Price, there had indeed been extensive glaciation, that ice had once covered large portions of North America.[57]

In the summer of 1938, he visited the oil fields of Oklahoma and northern Texas and received what he later described as a "real shock." For years, he had unquestioningly accepted Price's topsy-turvy view of the fossil record, but the order and system he observed in the Southwest convinced him that strata followed a predictable sequence. Other investigations persuaded him that the evidence for overthrusts was "almost incontrovertible."[58]

By 1940, Clark had substituted a non-Adventist text for Price's *New Geology* in his course at Pacific Union College and was describing Price's book as "entirely out of date and inadequate in its handling of its problems."[59] When Price learned of this, he exploded, angrily accusing his former student of suffering from "the modern mental disease of univeristy-itis" and of currying the favor of "tobacco-smoking, Sabbath-breaking, God-defying" evolutionary geologists.[60] Although Clark continued to believe in a literal six-day creation and universal flood, his acceptance of the geologic column was sufficient evidence for Price to conclude that he was satanically inspired.

Clark repeatedly tried to placate Price, but to no avail.[61] In 1941, Price filed formal heresy charges against Clark with the Pacific Union Conference. A specially appointed committee of leading Adventists met in San Francisco to investigate Price's charges, but the results proved inconclusive.[62] Nevertheless, Price continued his vitriolic attacks on Clark, which culminated in late 1946 (or early 1947) with the publication of a pamphlet entitled *Theories of Satanic Origin*, unmistakably aimed at PUC's geologist.[63]

Price's conduct in this affair undermined his position as the church's most respected spokesman on scientific matters and created sympathy for Clark, who was about to offer

the denomination a new flood paradigm.[64] To explain paleontological evidence in terms of the Biblical record, Clark developed a theory of ecological zones, which held that the various fossil-bearing strata represented the different ecological zones of the antediluvian world. He published this theory in 1946 in a volume called *The New Diluvialism,* the first really constructive effort by an Adventist to make sense of the geological record. Until this time, Adventist writers had devoted most of their energy to poking holes in the prevailing scientific theories.[65]

"Marsh insisted on using the historic Adventist interpretations of the Bible and the writings of Ellen White as the foundation of his scientific investigations."

The 1940s marked the eclipse not only of Price's geological views but his biological ideas as well, particularly those relating to speciation. In *Genes and Genesis* (1940), Clark took issue with the "extreme creationism" of Price, who insisted on the special creation of all known species (as defined by the Swedish naturalist Linnaeus). Although he believed that no new "kinds" had appeared since the creation, Clark agreed with Darwin that natural selection had indeed produced many new "species."[66]

Four years later, another young Adventist scientist, Frank Lewis Marsh, published a more sophisticated treatment of the species question in *Evolution, Creation, and Science.* Marsh, a former student of Price's at Emmanuel Missionary College, was apparently the first Adventist to earn a doctoral degree in biology, having received a Ph.D. from the University of Nebraska in 1940.[67] Like Clark, he rejected the Linnaean theory, advocated by Price, that all species had originated by separate creative acts. Zoologists, he pointed out, had identified thousands of species of dry-land animals, yet Adam had been able to name all the newly created animals in one day. Thus, it seemed unreasonable to equate the "kinds" of Genesis with the species of the twentieth century. To reduce the confusion, Marsh suggested calling the originally created types *baramins.*[68]

Despite the rise of Clark and Marsh, who themselves disagreed on the limits of speciation and the role of amalgamation, Price continued to influence Adventist science until his death in 1963 at age 93. During the last decades of his life, he worked closely with a small but growing community of Adventists in southern California interested in problems related to creation and evolution. As early as 1936, this group had urged the General Conference to sponsor field work in areas like the Grand Canyon, but the expense of such a program apparently frightened the Takoma Park brethren.[69] Rebuffed, Price and his friends in Los Angeles area organized the Deluge Geology Society in 1938 to collaborate "in the upbuilding of a positive system of faith-building science." Between 1941 and 1945, they published *The Bulletin of Deluge Geology and Related Sciences,* mailed to over 200 subscribers.[70] As described by Price, the society consisted of "a very eminent set of men. . . . In no other part of this round globe could anything like the number of scientifically educated believers in Creation and opponents of evolution be assembled, as here in Southern California."[71] Among the active members of the group were several physicians, including Cyril Courville and Molleurus Couperus, and Benjamin F. Allen, an amateur geologist and frequent contributor to *Signs of the Times.*

A schism in 1945 between the physicians and Allen resulted in the disbandment of the original group and the creation of the Society for the Study of Natural Science, composed largely of the same membership, except for Allen. Until 1948, this organization published *The Forum for the Correlation of Science and the Bible,* edited by Couperus. During this time, *The Forum* devoted considerable attention to the age of the earth, with Price and Couperus arguing for an earth "probably older than two billion years" and Clark defending the "ultra-literal view. . . that the matter composing the earth was spoken into existence as the first step in the six-day crea-

tion process."[72] By 1947, this organization was dying for lack of interest.[73]

A major breakthrough for Adventist science occurred at the 1947 Autumn Council. The General Conference Committee, concerned that the church still lacked a single Ph.D. in geology or paleontology, voted "that arrangements be made to send two mature, experienced men of proved loyalty, to take special studies in [geology and paleontology] in qualified institutions for advanced study."[74] The closest to being a professional paleontologist was Richard Ritland, who had recently received a doctorate from Harvard University in biology, with considerable emphasis on paleontology and comparative vertebrate anatomy.

Within a year, the General Conference had selected its candidates for advanced study: the mature and experienced Frank Lewis Marsh and P. Edgar Hare, a young chemistry teacher from Pacific Union College who wanted to enter the field of geochemistry.[75] Marsh enrolled at Michigan State University; Hare, at the California Institute of Technology. Together, they represented the Research Division of the General Conference Department of Education, to which a third member, Ritland, was added in 1960.[76]

Before long, the Research Division, renamed the Geoscience Research Institute and moved to Berrien Springs, Mich., split down the middle. Marsh insisted on using the historic Adventist interpretations of the Bible and the writings of Ellen White as the foundation of his scientific investigations. Hare and Ritland, on the other hand, expressed a willingness to reinterpret the Biblical account of creation and writings of Mrs. White if the scientific evidence so indicated, an "open-minded" approach their colleague regarded as "satanic."[77] Marsh could not understand, for instance, "why [as he thought] both Hare and Ritland and most of the SDA chemistry and physics teachers in our colleges insist on believing in the radioactive timeclocks even after it is known that they place Creation Week hundreds of millions of years ago. The Bible gives us. . . only a few thousand years since Creation Week."[78]

When Hare's research on amino acid ratios in marine shells yielded a much greater age than that traditionally accepted by the church, he candidly advised the General Conference of the potential problem. He also mentioned the impossibility of working harmoniously with Marsh, who believed "the only value of laboratory research is to corroborate the conclusions one reaches by a study of the Scriptures and Spirit of Prophecy."[79] The following year, President R. R. Figuhr notified Hare that he was free to remain with the Carnegie Institution in Washington, since the primary purpose of the Berrien Springs institute was to read, write and study — "looking for inconsistencies in the evolutionary writings that appear" — rather than do original research. [80] When Hare subsequently left the Geoscience Research Institute, his position went to Harold Coffin, a traditionally minded biologist who shifted the balance of opinion in Marsh's direction.

Through the early 1960s, Marsh, who directed the institute, urged the General Conference to endorse his conservative views. President Figuhr, however, apparently felt "that this discussion [regarding the age of the earth] has gone on during the 40 years that he'd been in the ministry, and he didn't think that it really amounted to much; it wasn't something that we should put too much time on."[81] In 1964, the General Conference retired Marsh, who attributed his fall to "a no-holds-barred process of indoctrination" carried on by his "open-minded" colleagues. A consolation appointment in the Andrews University Biology Department seemed to him little better than "banishment into the farthest corner of Siberia."[82]

Marsh's successor, Ritland, did indeed prove to be more "open-minded" than his predecessor. Unlike Marsh, who allowed his understanding of the Bible and the writings of Ellen White to determine his science, Ritland believed that God had revealed Himself both through nature and the Scriptures. Apparent conflicts between the two revelations might just as easily result from misreading the written work as from misinterpreting the natural record. Using this approach, Ritland

prompted many Adventist scientists and not a few administrators to reevaluate their attitudes toward geology and paleontology and to abandon the notion that the Noachian flood explained virtually the entire geological record.[83] In his book *A Search for Meaning in Nature* (1970), he emphasized the positive evidence of design in the world rather than the negative aspects of modern science.[84]

This approach, however, proved too liberal for the administration of Robert H. Pierson, who soon after his election to the presidency in 1966 made his position clear: "In our controversy with proponents of the evolutionary theory," he declared in the *Review and Herald* in 1968, "we must keep in clear perspective — *the Bible and the Spirit of Prophecy are not on trial.*"[85] It soon became evident that Ritland's days as director were numbered, that Marsh was now more attuned than he to the pulse of the church. In 1971, Ritland, finding it increasingly difficult to function within the constraints imposed by the administration in Takoma Park, resigned his position as director of the Geoscience Research Institute and joined Marsh in what was becoming an Adventist Siberia, the Andrews University Biology Department. The church's brief experiment with "open-mindedness" thus came to an end.

Under its new director, Robert H. Brown, the Institute quickly swung into line behind the Pierson administration. Those scientists who resisted the revival of the White-Price-Marsh philosophy soon found themselves without a platform or, worse yet, without a job. A serious problem remained, however. Because the church had never adopted a creed, identifying orthodoxy — and heterodoxy — sometimes proved difficult. To remedy the situation, church leaders, working with the Institute's trustees and staff, in 1976 drew up a formal "statement on creation," affirming the denomination's commitment to Ellen White's interpretation of Genesis. The opening paragraph of a widely circulated draft read:

> In harmony with the basic position of the Seventh-day Adventist Church regarding the divine inspiration of the Scriptures, we accept the historical accuracy of the book of Genesis (including chapters 1-11) as providing the only authentic account of the divine creation of this earth and the creation of life upon it in six literal days, of the fall of man, of the early history of the human race and that of the Noachian Flood of worldwide dimensions.[86]

Clearly, Adventist leaders as late as the mid-1970s still considered evolutionary biology and geology to be "sciences of satanic origin."

NOTES AND REFERENCES

1. Ronald L. Numbers, *Creation by Natural Law: Laplace's Nebular Hypothesis in American Thought* (Seattle: University of Washington Press, 1977), pp. 105-118. Roughly the first half of the following essay appeared originally in my article, "Science Falsely So-Called. Evolution and Adventists in the Nineteenth Century," *Journal of the American Scientific Affiliation,* 27 (March, 1975), 18-23, and is reprinted with the permission of the editor, Richard H. Bube.

2. Ellen G. White, "Science and Revelation," *The Signs of the Times,* (March 13, 1884), 161; *Spiritual Gifts: Important Facts of Faith, in Connection with the History of Holy Men of Old* (Battle Creek, Mich.: Seventh-day Adventist Publishing Association, 1864), p. 93.

3. "Science and the Bible," *Advent Review and Sabbath Herald,* 14 (Feb. 24, 1859), 107. This statement is attributed to a Dr. Cumming, probably Dr. John Cumming, the Scottish divine known for his studies of Biblical prophecies. Hereafter the *Advent Review and Sabbath Herald,* better known as the *Review and Herald,* will be cited as *R & H.*

4. J. H. Kellogg, *Harmony of Science and the Bible on the Nature of the Soul and the Doctrine of the Resurrection* (Battle Creek, Mich.: Review and Herald Publishing Association, 1879), pp. 10-11, 28-29. Later Kellogg seems to have become a theistic evolutionist. See Richard W. Schwartz, *John Harvey Kellogg, M.D.* (Nashville: Southern Publishing Association, 1970), p. 190.

5. [John Harvey Kellogg], "Evolution," *Health Reformer,* 9 (May 1874), 159. See also "Darwinism," *Ibid,* 8 (Dec. 1973), 381.

6. A. T. Jones, "The Uncertainty of Geological Science," *R & H,* 60 (Aug. 21, 1883), 530.

7. "Geology and the Bible," *R & H,* 26 (Oct. 17, 1865), 157.

8. [Uriah Smith], "False Theories of Geologists," *R & H,* 59 (Sept. 5, 1882), 568. Smith had attended Phillips Exeter Academy for several years, but financial considerations had prevented him from going on to college.

9. "The Blunders of Geologists," *R & H,* 26 (Oct. 24, 1865), 161-62; Jones, "The Uncertainty of Geological Science," p. 529; [Smith], "False Theories of Geologists," p. 568.

10. [G. W. Amadon], "The Skeptic Met," *R & H,* 16 (Sept. 4, 1860), 121.

11. "Geological Chronology," *R & H,* 35 (Feb. 8,

1870), 51. Reprinted, with an introduction, from an article by Patterson in the *Family Treasury*.

12. "That Old Skull," *R & H,* 36 (Oct. 25, 1870), 146. Reprinted from a work by Tuttle.

13. A. T. Jones, "The Uncertainty of Geological Science," *R & H,* 60 (Aug. 7, 1883), 497-98; (Aug. 14, 1883), 513-14; (Aug. 21, 1883), 529-30. The following year Jones published another series on " 'Evolution' and Evolution," *R & H,* 61 (Mar. 11, 1884), 162-63; (Mar. 18, 1884), 178-79; (Mar. 25, 1884), 194-95.

14. Jones, "The Uncertainty of Geological Science," pp. 513, 530.

15. J. O. Corliss, "Geologists vs. the Mosaic Record," *R & H,* 55 (Feb. 19, 1880), 116-17; Ellen G. White, "Science and the Bible in Education," *The Signs of the Times,* 10 (Mar. 20, 1884), 177; Stephen Pierce, "Does the Bible Agree with Science?" *R & H,* 38 (Oct. 3, 1871), 121; and Jones, " 'Evolution' and Evolution," p. 195.

16. [D. N. Lord], "The Structure of the Earth," *R & H,* 55 (Feb. 12, 1880), 99. Lord was an evangelical editor known for his writings on science and religion and on the fulfillment of Biblical prophecies.

17. See, for example, R. F. Cottrell, "The Antiquity of Man," *R & H,* 45 (Jan. 21, 1875), 29; and Jones, "The Uncertainty of Geological Science," p. 530.

18. "Turning the Tables," *R & H,* 39 (Apr. 9, 1872), 130. This article was taken from an address by the Rev. John Hall, a Presbyterian minister and writer.

19. See, for example, "Too Knowing for Faith," *R & H,* 60 (Nov. 8, 1877), 148; and Corliss, "Geologists vs. the Mosaic Record," p. 116.

20. [Lord], "The Structure of the Earth," p. 98. Uriah Smith made an equally strong pronouncement in "Giving Way," *R & H,* 60 (Oct. 23, 1883), 664.

21. Ellen G. White, *Spiritual Gifts,* p. 90.

22. *Ibid.,* p. 91. E. J. Waggoner, an Adventist physician and minister repeats Mrs. White's views in *The Literal Week* ("Apples of Gold Library," No. 18; Oakland, Calif.: Pacific Press Publishing Co., 1894), p. 2.

23. [James White], "The First Week of Time," *R & H,* 55 (Feb. 12, 1880), 104-105.

24. J. P. Henderson, "The Bible.—No. 7," *R & H,* 64 (July 5, 1887), 419. In 1860, the editors of the *R & H* reprinted a passage from *The Bible True,* by the Presbyterian minister William Plumer, advocating a similar interpretation; "Geology," *R & H,* 16 (July 3, 1860), 49. Dr. Kellogg , in his early years, also seems to have leaned toward this view; see *Harmony of Science and the Bible,* p. 20.

25. J. N. Andrews, "The Memorial of Creation," *R & H,* 24 (Apr. 7, 1874), 129. See also D. T. Bourdeau, "Geology and the Bible; or, a Pre-Adamic Age of Our World Doubtful," *R & H,* 29 (Feb. 5, 1867), 98; and "The Creation of Light," *R & H,* 34 (Sept. 28, 1869), 112.

26. Numbers, *Creation by Natural Law,* pp. 88-104.

27. *Ibid.,* pp. 77-87.

28. P. R. Russel, "Darwinism Examined," *R & H,* 47 (May 18, 1876), 153.

29. DeWitt Talmage, "Evolution: Anti-Bible, Anti-Science, Anti-Commonsense," *R & H,* 60 (Apr. 24, 1883), 261. Talmadge was an immensely popular and controversial minister in the Presbyterian church.

30. "Carlyle on Darwin," *R & H,* 51 (Jan. 17, 1878), 19; Talmadge, "Evolution," p. 261.

31. W. H. Littlejohn, "The Temple in Heaven," *R & H,* 62 (Feb. 24, 1885), 116. Uriah Smith explained the "defection of leading Christians . . . to the ranks of the evolutionists" as being the result of Satanic influence; "Giving Way," p. 664. On the widespread teaching of evolution in American colleges, see "Do Our Colleges Teach Evolution?" *Independent,* 31 (Dec. 18, 1879), 14-15.

32. Russel, "Darwinism Examined," p. 153. See also Adolphus Smith, "Science, Falsely So Called," *R & H,* 42 (July 8, 1873), 31.

33. Ellen G. White, *Spiritual Gifts,* pp. 92-95. See also Waggoner, *The Literal Week,* p. 3.

34. Ellen G. White, *Spiritual Gifts,* p. 75.

35. [Uriah Smith], *The Visions of Mrs. E. G. White: A Manifestation of Spiritual Gifts According to the Scriptures* (Battle Creek: SDA Publishing Association, 1868), pp. 102-104. Regarding this work, James White wrote: "I felt very grateful to God that our people could have this able defense of those views which they so much love and prize, and which others despise and oppose. This book is designed for a very wide circulation." James White, "New and Important Work," *R & H,* 32 (Aug. 25, 1868), 160.

36. [Smith], *The Visions of Mrs. E. G. White,* pp. 74-75. See also D. T. Bourdeau, "Geology and the Bible; or, a Pre-Adamic Age of Our World Doubtful," *R & H,* 29 (Feb. 5, 1867), 98-99.

37. For Price's biographical information, see Harold W. Clark, *Crusader for Creation: The Life and Writings of George McCready Price* (Mountain View, Calif.: Pacific Press, 1966).

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39. George McCready Price, *Illogical Geology: The Weakest Point in the Evolution Theory* (Los Angeles: Modern Heretic Co., 1906), p. 9.

40. G. M. Price to Martin Gardner, May 13, 1952 (courtesy of Martin Gardner).

41. William G. Moorehead to G. M. Price, Nov. 6, 1906 (Price Papers).

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46. Charles Schuchert, Review of *The New Geology,* by George McCready Price, *Science,* 59 (May 30, 1924), 486-487.

47. George McCready Price, Letter to the Editor, *ibid.,* 63 (Mar. 5, 1926), 259; G. M. Price to J. McKeen Cattell, Mar. 22, 1926 (Price Papers).

48. *Science,* 63 (March 5, 1926), 259. On Price's reputation, see also Martin Gardner, *Fads and Fallacies in the Name of Science* (New York: Dover Publications, 1957), p. 127.

49. G. M. Price to Molleurus Couperus, Nov. 1946 (courtesy of Molleurus Couperus).

50. William Jennings Bryan to G. M. Price, June 7, 1925 (Bryan Papers, Box 47, Library of Congress).

51. G. M. Price to William Jennings Bryan, July 1, 1925 (Bryan Papers, Box 47).

52. L. Sprague de Camp, *The Greatest Monkey Trial* (Garden City, N.Y.: Doubleday, 1968), pp. 401-402. For Price's view of Bryan's performance, see George McCready Price, "What Christians Believe About Creation," *Bulletin of Deluge Geology,* 2 (Oct. 1942), 76-77.

53. G. M. Price to E. S. Ballenger, Sept. 28, 1925 (author's personal collection). Regarding the debate, see *Is Evolution True? Verbatim Report of Debate Between George McCready Price, M.A., and Joseph McCabe* (London: Watts, 1925).

54. "Shout Down American in Evolution Debate," *New York Times,* Sept. 7, 1925,. p. 5; "Says Millions Here Oppose Darwinism," *ibid.,* Sept. 8, 1925, p. 9. Two of Price's disciples, Francis D. Nichol and Alonzo L. Baker, had recently debated the evolutionist Maynard Shipley in San Francisco; see Alonzo L. Baker, "The San Francisco Evolution Debates, June 13-14, 1925," *Adventist Heritage,* 2 (Winter 1975), 23-31.

55. Discussion of George McCready Price, "Revelation and Evolution: Can They Be Harmonized?" *Journal of the Transactions of the Victoria Institute,* 47 (1925), 183, 187. See also George McCready Price, "Geology and Its Relation to Scripture Revelation," *ibid.,* 46 (1924), 97-123.

56. Harold W. Clark, "What Is 'Flood Geology'?" *Naturalist,* 26 (Summer, 1966), 10-11; personal interview with Harold W. Clark, May 11, 1973.

57. Harold W. Clark to Richard M. Ritland, June 2, 1963 (courtesy of Richard M. Ritland).

58. *Ibid.,;* interview May 11, 1973.

59. Harold W. Clark to G. M. Price, [Apr. 9, 1940] (Price Papers).

60. G. M. Price to Harold W. Clark, Apr. 21 and June 9, 1940 (Price Papers).

61. Harold W. Clark to G. M. Price, Apr. 23, April 30, and Aug. 14, 1940 (Price Papers).

62. Harold W. Clark to G. M. Price, Oct. 20, 1944 (Price Papers); Glenn Calkins to the Members of the Committee Appointed to Listen to Professor George McCready Price and to Professor H. W. Clark, April 6, 1941 (Publishing Department Papers, General Conference of Seventh-day Adventists). Price insisted that he had not filed a charge of heresy, but "a charge of slander, of legal libel" (G. M. Price to Harold W. Clark, Oct. 23, 1944 [Price Papers]).

63. Although Price did not mention Clark by name, he did refer to Clark's publications (George McCready Price, *Theories of Satanic Origin* [Loma Linda, Calif.: Published by the author, n.d.]). A letter that accompanied copies of the pamphlet further identified the target as a professor "from our college at Angwin" (George McCready Price to Fellow Workers, n.d. [courtesy of Molleurus Couperus]).

64. L. E. Froom to G. M. Price, July 12, 1942 (Price Papers).

65. Harold W. Clark, *The New Diluvialism* (Angwin, Calif.: Science Publications, 1946). In 1944, Clark wrote: "Unfortunately, most of our attention up to this time has been directed toward the negative aspects of the problem. We have been intent on finding the flaws in the evolution theory, but have neglected to build up a positive creationism which would give one a definite concept of the creation doctrine in relation to the data of the various sciences." Harold W. Clark, "The Positive Aspects of Creationism," *Ministry* (May 1944), p. 5.

66. Harold W. Clark, *Genes and Genesis* (Mountain View, Calif.: Pacific Press, 1940).

67. For biographical information, see Frank Lewis Marsh, "Life Summary of a Creationist," unpublished MS, Dec. 1, 1968 (courtesy of F. L. Marsh).

68. Frank Lewis Marsh, *Evolution, Creation and Science* (Washington: Review and Herald Publishing Association, 1944). On the differences between Marsh and Price, see Frank L. Marsh to G. M. Price, Sept. 5, 1943 (Price Papers). Despite their disagreements, Price praised Marsh's book (G. M. Price to Harold W. Clark, Oct. 23, 1944 [Price Papers]).

69. Clark, *Crusader for Creation,* p. 58.

70. "Bulletin Mailing List, etc.—1944, 1945, 1946" (Courtesy of Molleurus Couperus). *The Bulletin of Deluge Geology and Related Sciences* appeared in five volumes between June 1941, and December 1945. In 1946, it was superseded by *The Forum for the Correlation of Science and the Bible,* which continued until 1948 under the editorship of Molleurus Couperus.

71. G. M. Price to H. W. Clark, Oct. 23, 1944 (Price Papers).

72. George McCready Price, "In the Beginning," *The Forum,* 1 (1946-1947), 9; Molleurus Couperus, "Some Remarks Regarding the Radioactive Time Estimation of the Age of the Earth," *ibid.,* 2 (1947-1948), 119; Harold W. Clark, "In Defense of the Ultra-Literal View of the Creation of the Earth," *ibid.,* 1 (1946-1947), 11.

73. Molleurus Couperus to H. W. Clark, May 8, 1947 (courtesy of Molleurus Couperus).

74. Minutes of the Autumn Council, Oct. 25, 1957, 226th Meeting, General Conference Committee, Vol. 19, Book 5, p. 1004 (Archives, General Conference of Seventh-day Adventists).

75. Minutes of the 259th Meeting of the General Conference Committee, Apr. 24, 1958, *ibid.,* p. 1156.

76. Minutes of the 108th Meeting of the General Conference Committee, Jan. 21, 1960, Vol. 20, Book 3, p. 511.

77. Marsh, "Life Summary of a Creationist," p. 5a.

78. Frank L. Marsh to G. M. Price, March 14, 1962 (Price Papers).

79. P. Edgar Hare to Richard Hammill, Feb. 7, 1963 (courtesy of P. Edgar Hare).

80. R. R. Figuhr to P. Edgar Hare, Feb. 5, 1964 (courtesy of P. Edgar Hare).

81. Personal interview with Frank Lewis Marsh, Aug. 30, 1972.

82. Marsh, "Life Summary of a Creationist," pp. 5b-5c.

83. Personal interview with Richard M. Ritland, May 7, 1973. For evidence of Ritland's influence, see G. M. Price to F. L. Marsh, Jan. 10, 1960 (courtesy of F. L. Marsh), and H. W. Clark to F. L. Marsh and Others, Nov. 19, 1960 (courtesy of R. M. Ritland).

84. Richard M. Ritland, *A Search for Meaning in Nature: A New Look at Creation and Evolution* (Mountain View, Calif.: Pacific Press, 1970).

85. *R & H,* Oct. 10, 1968, p. 23, quoted in Marsh, "Life Summary of a Creationist," p. 5c.

86. "Tentative Creation Statement," SPECTRUM, 8 (Jan. 1977), 58.

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 northeastern 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 archaelogical finds that had 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.

"Since the group consisted largely of scholars, . . . many were not used to a method of presentation which selectively marshalled the evidence in favor of denominational interpretations."

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
		Recent	
	Quaternary	Pleistocene	2.5
Cenozoic		Pliocene	7
		Miocene	26
	Tertiary	Oligocene	38
		Eocene	54
		Paleocene	65
	Cretaceous	Upper, Lower	136
Mesozoic	Jurassic	Upper, Middle, Lower	190
	Triassic	Upper, Middle, Lower	225
	Permian		280
	Pennsylvanian	Upper, Middle, Lower	325
	Mississippian	Upper, Lower	345
Paleozoic	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 relative 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 Paleosoic, Lower Paleosoic 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 scarecely 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.

"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."

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 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.)

"Richard Hammill. . . 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."

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 archaelogists, 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 test, 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 sucessful 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);

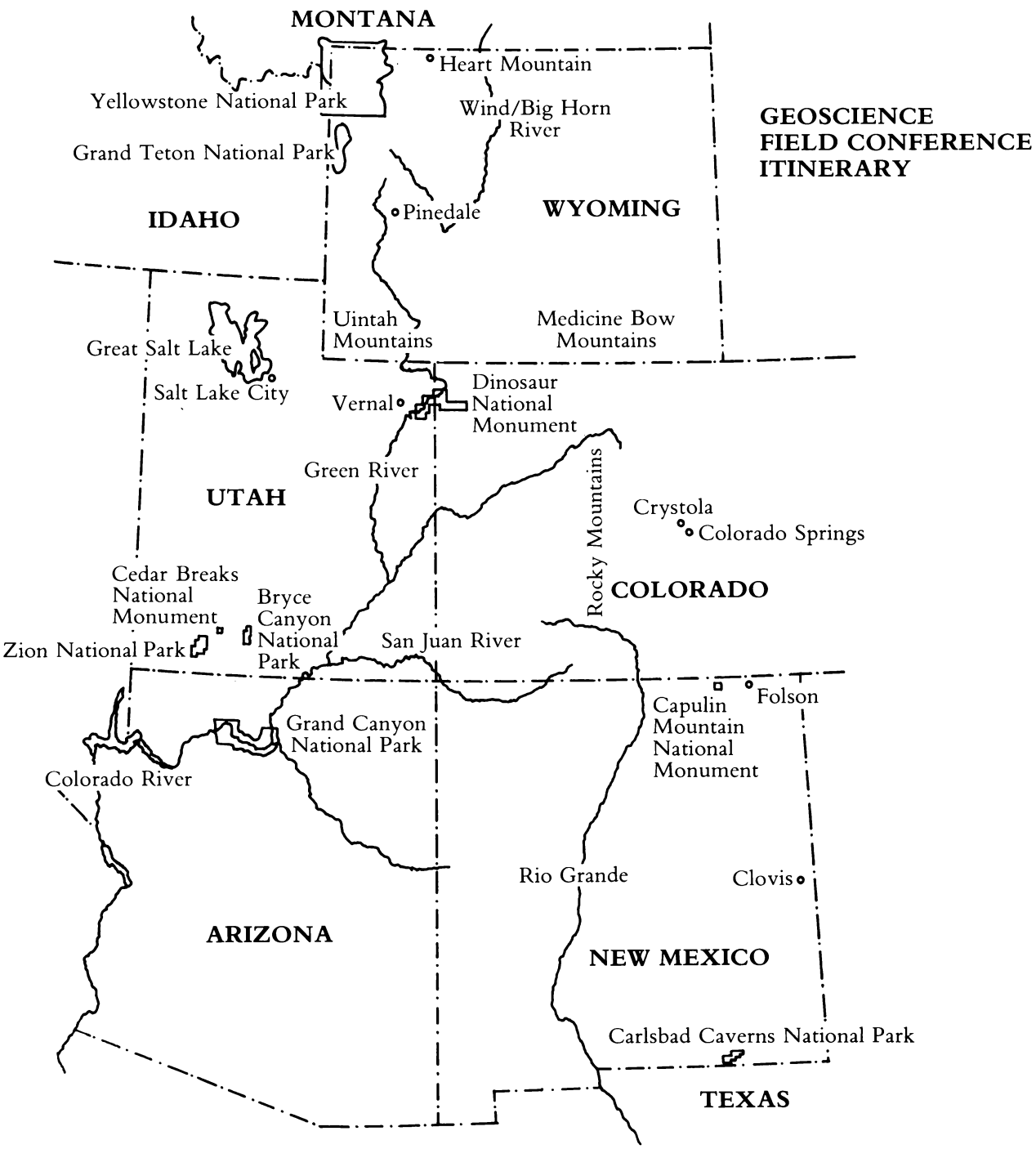
from Seminar Marienhöehe: Heinz Zech (Mathematics);

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).



GEOSCIENCE FIELD CONFERENCE ITINERARY

The Yellowstone Petrified Forests

by Harold G. Coffin

The Petrified Forests of Yellowstone have been known for nearly 100 years, but only a few of the thousands who visit the park see this world-famous attraction. Those who take the effort to climb to the sites are impressed by the upright position of many of the stumps and come away with the conviction that each level of petrified stumps represents an ancient forest buried in position of growth.

This interpretation is so obvious that any alternate explanation runs the risk of appearing incredible. Despite this risk, I propose that the stumps (both prostrate and erect), leaves, needles and other plant debris floated to their present location and settled onto the surface of successive underwater volcanic mud slides. Thus, many levels accumulated in a relatively short time. The Genesis flood makes an attractive source for the water in this model.

We will now examine the evidence that supports this interpretation.

Harold G. Coffin, research scientist at the Geoscience Research Institute, is the author of *Creation – Accident or Design?*

The Petrified Trees

The most striking feature of the petrified trees is the erect position of many of the stumps. Without doubt, this is the strongest argument for the trees being *in situ*. Nevertheless, many features of the petrified trees are inconsistent with an *in situ* interpretation.

Abrupt Root Terminations. If the trees were washed out of a growing forest and transplanted to their present location, some of the roots, especially the large roots, would be broken. Observations of roots of trees bulldozed out of the ground in clearing operations have shown that although the smaller roots are usually intact the larger roots are sometimes broken. I have found seven examples of abruptly terminating "broken" roots in the Yellowstone Fossil Forest. Many other examples are suggestive of sudden root terminations, but a positive field identification of this feature is often difficult because of postpetrification breakage and the difficulty of digging into the well-indurated rock in order to expose the roots.

Overlapping trees. Superposed levels of upright stumps are sometimes only a vertical foot apart. Occasionally, a stump arising

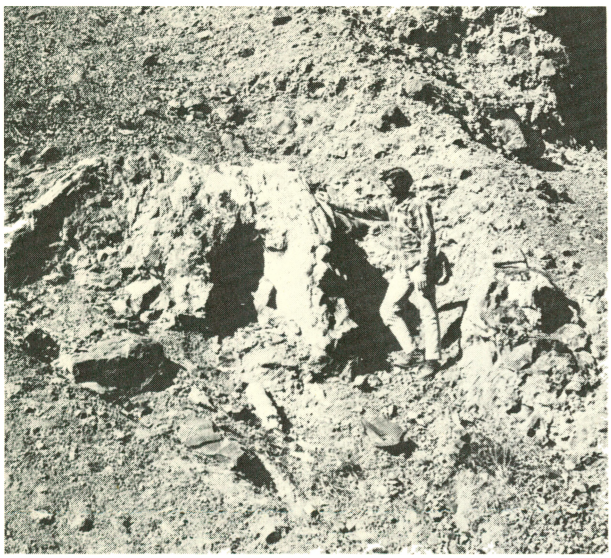


Figure 1. Overlapping trees in the classic Fossil Forest in the Lamar Valley. The roots of the larger tree are to the left of the person (Lanny Fisk) and the smaller tree which arises from a lower level is to the right.

from a lower level extends through or into the "forest" level above it. These "overlapping" stumps are compatible with the growth interpretation *if* the upper level trees are small because a protruding snag from a lower level would then be exposed to decay only during the short lifespan of the small trees on the upper level. If, however, the stumps on the upper forest level are from large trees, there should have been sufficient time for decay of the exposed top of the overlapping stump. For example, in the classic Fossil Forest, the top of a Sequoia 45 centimeters in diameter terminates at the root zone of an adjacent large stump rooted in a higher level (Figure 1). Since most of the top of the large stump is still covered by hard rock, its age cannot be determined by a ring count, but other petrified Sequoia stumps of comparable size have approximately 500 rings. Although Sequoia is known to be durable wood, a small dead Sequoia snag only 45 centimeters in diameter should suffer extensive decay after 500 years of exposure in a semitropical forest. Instead, it possesses distinct rings and shows no signs of decay.

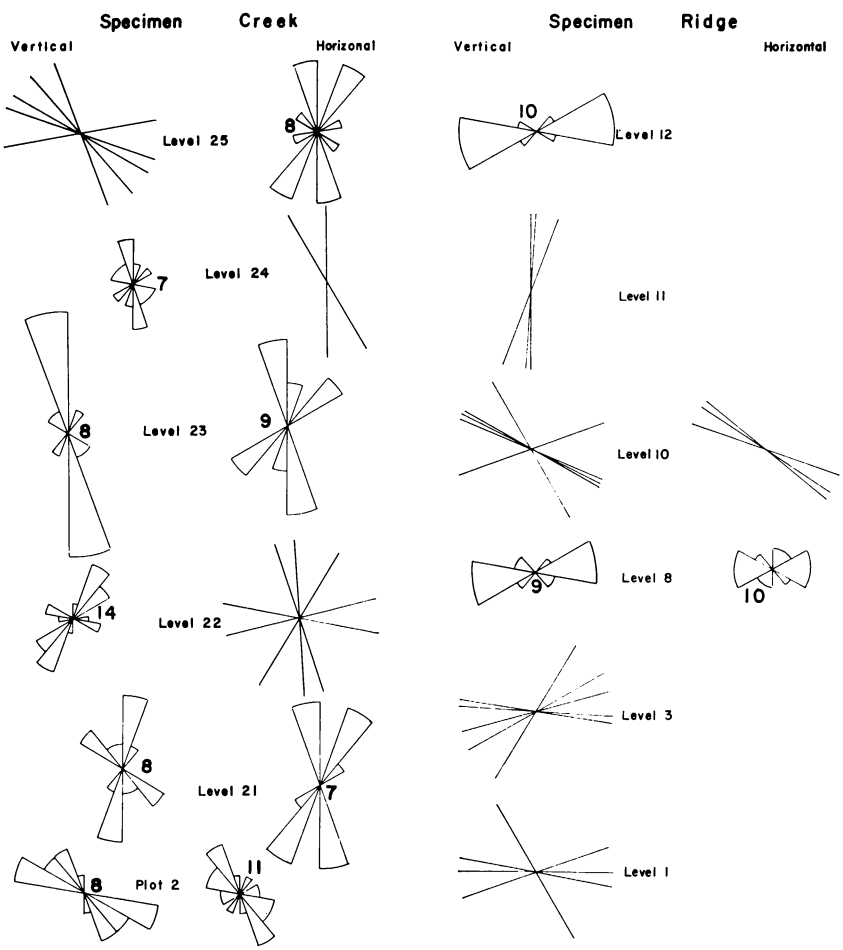


Figure 2. Orientation of vertical and horizontal petrified trees in the Specimen Creek and Specimen Ridge areas, Yellowstone National Park. For levels with five or less measurable trees, each tree is represented by a line. Numerals beside rose graphs represent sample size.

Orientation. Prostrate logs and the long axis of the cross sections of the tops of standing stumps seem to show a tendency to be aligned in the same direction (Figure 2). This type of orientation does not seem to be found in living forests. Observations in three modern forests with flat floors (the fossil forests of Yellowstone have flat floors) not adjacent to clearings or canyon walls have failed to establish a preferred orientation for even the prostrate trees, let alone a common orientation for prostrate trees and the long axis of asymmetrical upright trees.

The similarity of orientation for prostrate logs and upright stumps seems to require a common force (such as moving water) acting on both. A log moving with a current will align with the current direction, but will an upright floating stump with only slight variation in stump symmetry also align itself with the current? I believe it will because the asymmetry is usually a reflection of the major roots which have produced buttressing of the lower tree trunk. Therefore, currents acting on the roots of drifting stumps could produce the observed orientations.

Diverse Flora. Knowlton (1899), Read (1933) and Dorf (1960) have identified over 100 species of plants in the Yellowstone Petrified Forests. Pollen studies increase the figure to over 200.

The ecological diversity represented by the species is unexpected if the trees are in position of growth. Species range from temperate (pines, redwoods, willows) to tropical and exotic (figs, laurels, breadfruit, catsura), and from semidesert to rain forest types. This diversity may be an indication that the Fossil Forests are an artificial assemblage of stumps, leaves and pollen transported during the Flood from several pre-Flood ecological zones.

Dendrochronology. Dendrochronolgy is based on the principle that trees subjected to similar environmental conditions will develop rings that exhibit similar trends of growth. A sequence of wet or dry years will be reflected in the relative thickness of the rings. Although each tree is individualistic in its growth response to the environment, there is enough similarity among the trees of a forest to permit plots of ring width to be matched ring for ring.

The basic requirements for successful dendrochronology are: 1) trees with variable rings; 2) rings that persist all the way around the trunk; and 3) trees that grew in similar habitats.

If they are in position of growth, the petrified trees in Yellowstone meet these minimum requirements. Matching ring patterns from the same level would be strong evidence that the stumps grew where they now stand. But absolutely no matching has been found using the manual skeleton plot technique. Two trial runs with computer matching have also proved unsuccessful. Computer research is continuing on a more detailed and controlled basis.

Figure 3. A small petrified tree from the Specimen Creek area surrounded by coarse breccia.

It is difficult to understand why matching connot be seen with relative ease if the trees are *in situ.* If the trees have been brought together from diverse habitats and geographical areas by water transport, the lack of matching is more readily understood.

Small Erect Trees. Characteristically, neither bark nor limbs are preserved on the trees. Some of the large prostrate logs originally may have had limbs a foot or more in diameter but now only scoured knots are left. If subaerial volcanic mud slides were sufficiently strong to break off the limbs and strip away the bark from rooted trees, why were the very small trees not bent or broken? Small trees down to three centimeters in diameter are seen (Figure 3). The boulders incorporated in the surrounding breccia are sometimes much larger in diameter than are the trees against which they rest, yet of the hundreds of petrified trees examined over the years, only two have been seen with a greenstick fracture (Figure 4). If the trees were transported, that is, if they moved with the mud in which they are buried, they would not have been subjected to horizontal shear.

The Organic Levels

To this point in our discussion, we have been considering only the stumps found in the Yellowstone Petrified Forests. Associated with the erect stumps at root level are bands of organic matter consisting of leaves, needles and plant debris which have been interpreted as the forest floors on which the trees grew. However, in almost every specific detail, study of these levels indicates that they are atypical of true growth levels.

Three aspects of the organic levels have been used as evidence for the *in situ* interpretation of the trees: 1) the organic matter occurs at the root levels of the stumps; 2) the organic matter consists of leaves, needles and debris typical of material that falls from growing trees; and 3) the organic levels and the ash below them contain rootlets.

The location of the organic band at the level of the roots of the upright stumps is indeed similar to modern forests where organic litter is scattered on the forest floor, but the drift model can also account for this feature. Wood and plant fragments could settle out of a body of water along with the stumps to produce the observed association between the roots of standing stumps and organic matter.

The fact that the organic material looks like typical forest floor litter might be taken as support for the growth model. However, water that destroyed a pre-Flood forest and transported the plants and trees could also take with it the litter that had accumulated on the pre-Flood forest floor. This litter could then settle out of the water along with the stumps.

Modern forest soils are riddled with rootlets. Although small streaks of vegetable structure can be seen occasionally in the fossil organic levels or below them, our survey of hundreds of cross sections of levels confirms our statement that rootlets are rare. Since they are so uncommon and could easily be the result of the fortuitous vertical arrangement of small plant fragments that became mixed into the volcanic mud slides, this feature cannot be used as a strong argument for the growth model. Decay of most of the original rootlets cannot be defended because bits and pieces of well-preserved, very small, fragile plant fragments are found scattered in the ashy matrix of the breccia layers as well as in the organic zones.

Preservation. Only once have I seen fossil organic matter that appears like ancient humus. In the hundreds of other cases, leaves, needles and wood chips are obvious. In some instances, the preservation is phenomenal — so perfect that the plant struc-

Figure 4. A petrified tree from Tom Minor Basin near the northwest portion of the park that illustrates the only green-stick fracture so far discovered. Notice the complete absence of an organic level.

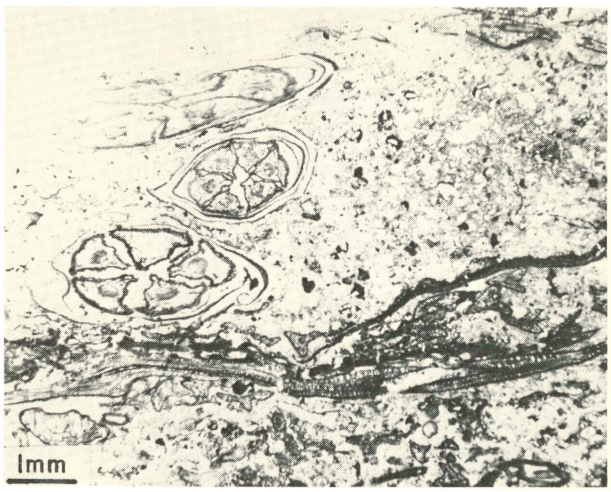


Figure 5. Beautiful preservation of buds and leaves from the Specimen Creek Petrified Forest.

tures in the thin sections look like fresh living tissue (Figure 5). Quick burial by volcanic lahars would provide the mechanism for good preservation of organic matter in either model. However, there is an aspect of preservation which seems difficult to explain by a growth model. In a living forest floor, decay increases downward into the ground. Recently fallen litter may be little decayed, but that which has fallen in successively more remote seasons shows progressively increasing decay until eventually only dark unidentifiable humus remains. The absence of differential decay is universal in the petrified forests of Yellowstone. It might be said that the volcanic lahars have mixed and disturbed the natural forest floor. However, if the organic matter was so consistently and thoroughly mixed by the volcanic mud slides, one would expect irregular thick lenses of organic matter. Instead, the organic bands are remarkably consistent horizontally. Reference to Figure 6 shows that although the bands have hiatuses and split and recombine, the thickness of the bands changes little.

Spatial Relationships. Fifty-nine organic levels on the slopes above Specimen Creek ranged in measured thickness from only a trace to 15 centimeters. The average is about three centimeters. Trees arising from within breccia beds and lacking *any* organic level at their base have been found in all of the petrified forest exposures I have seen.

It is possible to see mature living trees growing on rocky slopes almost devoid of humus. Usually, humus has not accumulated because of the steepness of the slope or because of the porous nature of the rocky terrain. The Yellowstone Petrified Forests are almost flat, and the ashy nature of the matrix in which the organic debris is located makes the use of such modern examples irrelevant.

The horizontal bedding in almost all the organic levels is striking. Of course, most needles, leaves and branches that fall from growing trees accumulate on the ground horizontally. However, ground-level shoots and the buried roots of growing herbs, shrubs and trees constitute an important fraction of vertically oriented material. This is seldom seen in the organic levels.

Sedimentary Features Typical of Water Deposition. One hundred and ten thin-section slides of organic horizons have been examined. The evidences of water action are striking. Table 1 tabulates 15 different features associated with water activity but not with gradual soil formation. Normal grading (from coarse to fine upward) is obvious for nearly half of the slides (Figure 7). In many instances, the grading starts several centimeters below the organic matter and con-

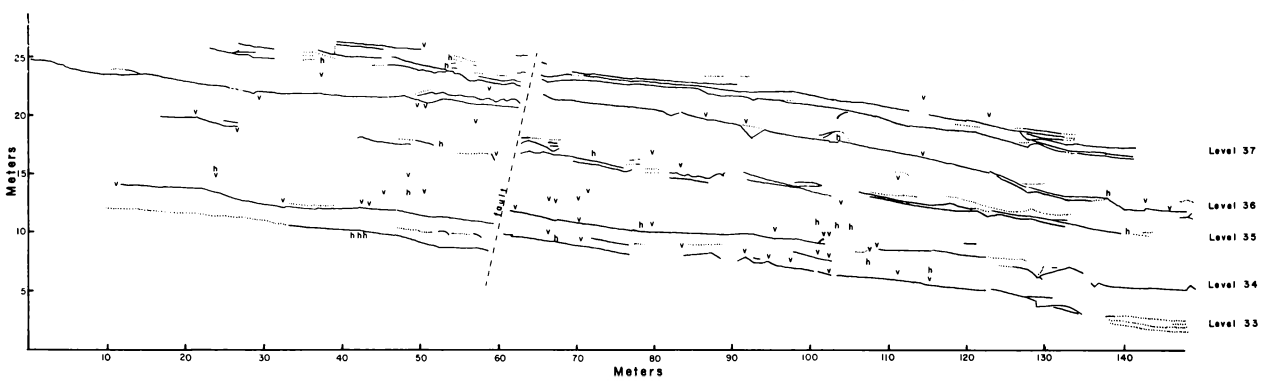


Figure 6. Survey of levels 33 to 37 on the Specimen Creek petrified forest. Each level is multiple and complex; v = vertical trees; h = horizontal trees.

TABLE I. Analysis of 120 Vertical Thin Sections of Organic Levels from Seven Yellowstone Petrified Forests

Features	Specimen Creek	Specimen Ridge	Fossil Forest	Mount Norris	Mount Hornaday	Cache Creek	Miller Creek	Totals
Total number of slides	85	2	3	11	11	3	5	120
Total number of levels	69	2	3	4	6	3	4	91
Grading of sediments (normal and reverse)	31		2	3	4	1	3	44
Other features of water deposition (ripples, loading, cross laminations)	16		1	2	3	1	2	25
Unweathered feldspar crystals	82	2	3	11	8	3	4	113
Grading of sediments between leaves	26		1	3			1	31
Sorting of organic matter	12		1	3		1	3	20
Atypical soil profile	60	1	2	9	9	3	2	86

tinues up into the vegetable matter where it terminates as fine ash. Reverse grading (fine to coarse upward) is seen occasionally. Thin beds of sediments (laminations) a fraction of a centimeter thick often make up the profile as seen in the slides. This is certainly atypical of true soils and requires water movements. Other sedimentary features typical of water deposition occasionally seen are cut-and-fill, loading and rippling.

There also is size sorting of organic material in some levels. Figure 8 shows a relationship between the size of the ash sediment and

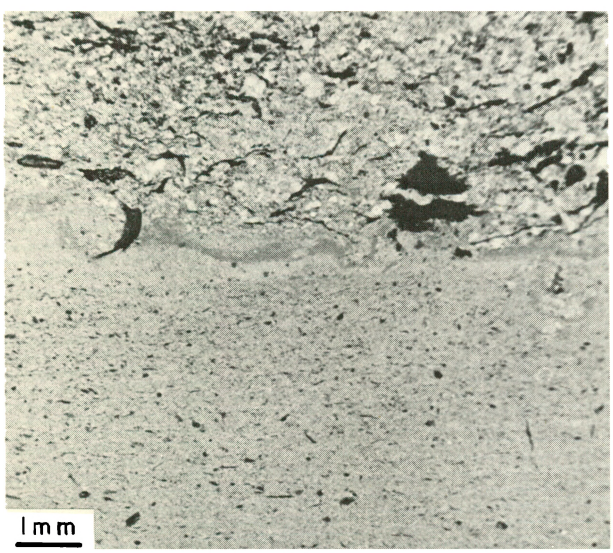


Figure 7. A vertical thin section of an organic level from Mt. Hornaday. Note the sorting of both organic and inorganic matter. The dark streaks and spots are vegetable matter.

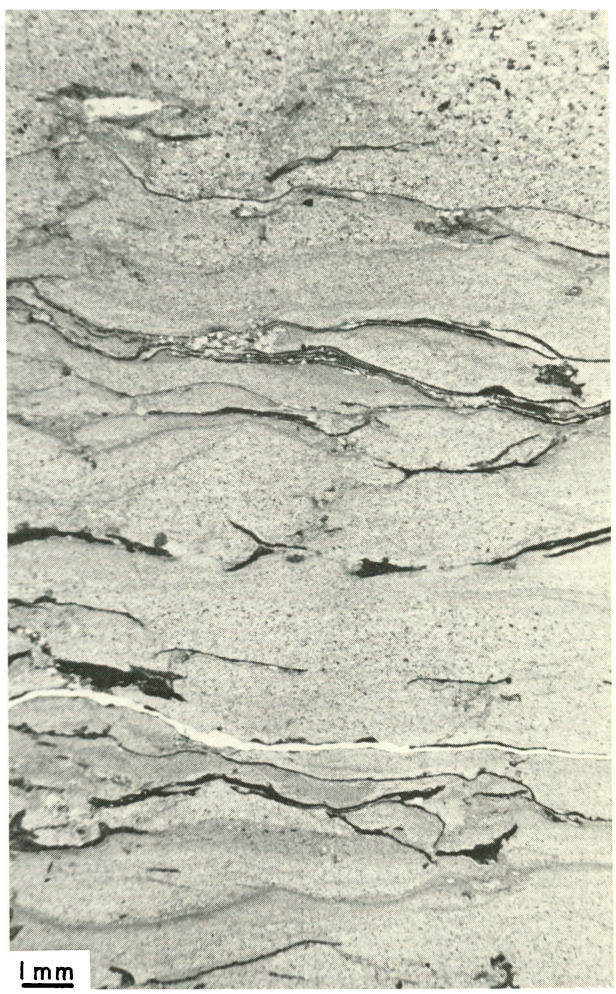


Figure 8. A vertical thin section of an organic level from Specimen Creek. Normal bedding of sediments exists between the dark lines which are cross-sections of the horizontally bedded deciduous leaves.

the size of the organic material — fine sediment, fine organic matter; coarse sediment, coarse organic matter. There is even size sorting of the inorganic particles *within* the organic matter. Figure 8 is characteristic of several levels that show sorting of inorganic matter between petrified leaves. To my knowledge, there is no way of achieving such a sedimentary feature in a normal forest floor. Only the simultaneous settling of ash and leaves from a fluid suspension could achieve this phenomenon.

Cross sections through true growth surfaces show a typical profile of organic density from top down. The profile is revealed by increased blackness or richness of humus toward the surface of the ground. Most of the Yellowstone organic levels have the organic matter mixed into the sediments with no prevailing order of density or with the greatest accumulation of organic matter at the bottom.

The complexity of the organic levels is particularly outstanding in the Specimen Creek and Cache Creek areas. Figure 6 illustrates five surveyed levels from Specimen Creek. Notice that the organic levels often are multiple, split and recombine, appear suddenly and end abruptly, and exhibit other odd characteristics. Modern multiple growing surfaces could result from flash floods in arid areas or from periodic burial by river mud spilling over banks during high water. However, the Yellowstone Petrified Forests do not represent these two types of environments. Erosion channels are infrequent in the Yellowstone exposures and no paleobotanist has suggested that this was an arid region.

Could the upper streaks of these multiple levels represent the leaf fall zones associated with air drop ash in volcanic eruptions? My field observations and thin section studies have failed to distinguish any significant difference between surfaces from which visible trees arise and adjacent organic levels containing no visible upright trees. If leaf drop zones are present, they are not readily apparent and cannot be distinguished from the other levels.

Taxonomic Characteristics. Taxonomic sorting of the constituents in the organic bands was noticed early in my research. Broad leaves occur at the top of the organic zone, mixed broad leaves and needles below, and only needles at the bottom. Leaves, needles, cones, limbs and bark fall as a well-mixed litter onto the floor of living forests. But in water, needles saturate and sink to the bottom before broad leaves. Thus, the taxonomic sorting of the organic levels appears more readily explained by water transport.

There is also a lack of taxonomic agreement between the fossils preserved in the organic levels and the dominant trees arising from the levels. One would expect to find many Sequoia needles and some cones since most of the upright trees are Sequoia. How-

Figure 9. Successive beds of reversely graded breccia seen on Mt. Hornaday.

ever, large numbers of broad leaves and only a few pine needles are seen in the organic levels and cones of any type are rare.

Fisk's (1976) palynological study found little pollen of sycamore that is well represented by fossil leaves. Wind-transported pollen such as sycamore should have left a rich pollen record in the forest floor. In another palynological study, De Bord (1977) studied four levels intensively. He found no positive correlation between fossil pollen abundance and the proximity of possible source trees. Pine pollen, for example, was underrepresented in three of the four levels analyzed. Sufficient difference existed between individual samples on the same level that single sample analysis could not be used to adequately describe the level.

Chemistry and Mineralogy. Minerals such as feldspar weather into clay under attack of the carbonic acid that percolates into the ground as rain falls on a humus-mantled surface. Thus, the presence of clay would argue for time and a normal soil development. Over 300 samples from the Specimen Creek area have been subjected to X-ray diffraction and infrared analyses. Samples from other areas have also been tested. No clay has been detected except for relatively infrequent bands that show little relationship to the organic levels. The tentative conclusions from this study appear to rule out the passage of time that would result in mineral weathering and true soil formation. Spark source mass spectrometry research appears to corroborate the above data that suggest the rapid laying down of the breccia beds.

X-ray diffraction study has also shown that the mineral content of the sediments through hundreds of vertical feet appears identical. Would successive eruptions over a period of tens of thousands of years continue to lay down ash with identical suites of minerals? This question is being pursued by comparative studies with other volcanic areas whose major volcanic episodes with many pulses within each episode better explain the Yellowstone breccia beds, especially those of Specimen Creek.

Considered as a whole, the characteristics of the organic levels constitute a strong denial of the view that they are true soils or growth surfaces (Table II).

TABLE II. Summary Comparison Between a Living Forest and the Yellowstone Petrified Forests

As Expected in a Living Forest	As Actually Seen in Yellowstone
1. All roots intact	1. Some roots abruptly terminating or broken
2. Smaller trees torn out or pushed over by breccia slides	2. Small trees upright and unbroken
3. Buried upright snags in various stages of decay	3. Upright trees showing no difference in decay above or below ground level
4. Ring patterns of trees should cross-match	4. Ring patterns of trees do not cross-match
5. Upright and prone trees without similar orientation	5. Upright and prone trees with similar orientation
As Expected in a Normal Forest Floor	**As Actually Seen in Yellowstone**
1. A thick humus layer, especially if the trees are large	1. Organic level usually thin and sometimes absent
2. Increased decay of humus from top down	2. Good preservation all through the level
3. A normal soil profile — organic matter increasing toward top	3. No trend in the arrangement of organic matter of profile reversed
4. Kinds of organic matter unsorted	4. Kinds of organic matter often sorted
5. One main layer of humus for each living forest	5. Multiple and complex layers that split and recombine
6. Some evidences and remains of animals expected on or in soil	6. Absolutely no evidences or remains of animals found in organic levels
7. Leaves and needles on forest floor will agree with the trees	7. Leaves and needles often do not agree with dominant or adjacent trees
8. Pollen will agree with the trees and be present in great abundance	8. Pollen may not agree with trees or represented disproportionately
9. Clay produced as a result of weathering over time	9. Clay absent
10. Cones of the dominant conifer present on the forest floor	10. Sequoia cones absent

The Sediments

The volcanic breccias of the Yellowstone area have been difficult to interpret. Most volcanologists who have studied the area believe that they are mud slides or lahars that spread out along the bases of volcanoes (Parsons, 1969). However, many problems are associated with this view.

The material is extremely variable, ranging all the way from agglomerate (large, rounded boulders) to breccia (angular rocks of variable size). Some beds are extremely coarse with little matrix, whereas others are mostly ash with a free-floating framework of pebbles. Green to light gray beds of ash may be interspersed between breccia beds. These usually cannot be traced far horizontally. The beds of breccia range in thickness from 30 centimeters or less to ten meters thick. Most are from one to three meters thick. The discontinuous nature of the breccia beds and the rapid changes of sediment type would seem to require many local eruptive centers or source areas but these eruptive centers are hard to find.

The relatively low dip of the strata and the flow characteristics of breccia pose a problem. Most of the beds are so flat (less than 5° dip), that it is difficult to see how they could represent mud slides over dry land. Some lubricant such as water seems to be needed to facilitate the movement of these slides over slopes of such low gradient.

One feature of the Yellowstone volcanic breccias that has previously gone largely unreported is the reverse bedding (Figure 9). Upward grading from fine to coarse (instead of from coarse to fine) is not common in the geological record (Fisk, 1974). Fisher (1971) gives both subaerial and submarine examples, but the latter are most like those of Yellowstone. Walker (1975) would classify deposits of this type as turbidites — underwater slides of water-saturated sediments of greater density than the surrounding water. Although turbidites composed of such coarse materials as volcanic breccia are difficult to reproduce in laboratory experimentation, the presence of reverse grading may indicate that the beds were emplaced under water.

If these sediments were deposited under water, one would expect to find some evidences of water-dwelling animals. However, fossil remains of any animals are unknown. The absence of animal remains is difficult to explain with either "ingrowth" or "transport" models.

The Vertical Flotation of Trees

Under normal conditions, an upright tree is located where it grew. Therefore, it is only natural that the Petrified Forests of Yellowstone have been interpreted as trees in position of growth. No challenge of this interpretation can succeed unless some other satisfactory explanation for the vertical stance can be found.

Could water have transported the Yellowstone petrified stumps and deposited some of them upright in their present locations? Experiments I have conducted, evidence cited in the literature and observations in nature, lead me to conclude that trees as well as other plant parts such as horsetail stems will float vertically if given sufficient time and water.

To test the feasibility of upright flotation, I placed 12 small white fir stumps with roots in fresh and salt water. The stumps were two to seven centimeters in diameter and three to 15 centimeters long. After from three to more than 21 days, *all* of the trees assumed a vertical position suspended from the surface of the water. Then, after a few hours to several days, the vertically floating trees slowly settled onto the bottom of the tanks *still erect.* Because the density of the trees was so near that of the water, they often would appear to be suspended in the middle of the water, but closer observation revealed a rootlet touching the bottom. This experiment duplicates some of the results achieved by Henry Fayal's flotation experiments conducted in the late nineteenth century and published in an 1886 monograph.

At one Yellowstone location, short sections of *Equisetum* (horsetail) not over four inches tall were found in the organic level. *Equisetum* is rare in the Yellowstone fossil forests but near Clarno, Ore., great numbers of vertical petrified horsetails, level above level, can be seen in sediments similar to

those in Yellowstone. Horsetails are like large hollow straws and do not seem to be good candidates for vertical flotation. Therefore, an experiment on the flotation of horsetails in salt and fresh water was undertaken (Coffin, 1971, p. 2019). Surprisingly, nearly two-thirds (63 percent of 140 sections of *Equisetum)* ultimately floated vertically or stood erect on the tank bottom. In this experiment, vertical orientation occurred after three to 20 days depending upon the length and size of the horsetail stems and whether the stems were fresh or dead.

Reports of the vertical flotation of trees and plants can be found in the literature. In a reference work on coal, Francis (1961, p. 28) reports, ". . . it is natural for short stems attached to the heavy roots of trees to float upright, with the roots downward, when transported by deep water, particularly if the roots enclose a ball of clay or gravel." The volume on paleoecology by Ager (1963, p. 85) makes the following comment: "E. D. McKee (personal communication, 1963), has told of palm trees being swept from a Pacific atoll during hurricanes and coming to rest in considerable depths of water in an upright position because of their heavy, stone-laden roots, so that even trees in position of life may not be completely beyond question."

"In spite of many unanswered questions, I am convinced the transport hypothesis merits serious consideration because it seems to account for more of the available facts than the *in situ* hypothesis."

While sailing along the coast of New Guinea, the famous Challenger expedition encountered long lines of drift brought down by flooding rivers. "Much of the wood was floating suspended vertically in the water, and most curiously, logs and short branch pieces thus floating often occurred in separate groups apart from the horizontal floating timbers. The sunken ends of the wood were not weighted by an attached mass of soil or other load of any kind; possibly the water penetrates certain kinds of wood more easily in one direction with regard to its growth than the other, hence one end becomes water logged before the other" (Challenger, 1885, p. 459).

In his classic monograph on the formation of coal beds, John Stevenson (1911-1913) discussed the upright flotation of trees. Although it was his opinion that the majority of coal beds were *in situ,* he hesitated to use the upright position of the petrified trees in these beds as an argument in support of his view.

Vertical flotation can also be observed today in nature. I have observed stumps of trees sitting upright along beaches and shores where high tides have left them. Along the shores of Lake Powell, Ariz., when spring water was higher than usual, I have seen many twigs, rootlets and stems floating vertically. I have observed the same phenomenon in quiet waters among the Florida Keys.

Actually, the chances that trees will float upright in water are very good. The root system gathers water to maintain the life of the tree. It is only natural that in water the lower portion of the trunk with its roots will absorb moisture faster than the other parts. The result can be vertical flotation — given enough time and water.

If the Yellowstone Petrified Forests were transported by water to their present locations these two requirements — sufficient time and water — must be considered. What kind of model can we develop that meets these requirements and fits better the facts obtained from the study of the Yellowstone Petrified Forest than the *in situ* model?

An Alternative Hypothesis

At present, I propose the following model as best accounting for all the data gathered. Volcanic activity in the Yellowstone region occurred while the area was at least partly under water. Trees, some vertical, floated in the water along with organic debris. As trees and vegetable matter became water saturated, they settled down onto the breccia at

the bottom. Within a relatively short time (days or weeks), another slide moved over and around the trees and organic debris. Before the appearance of each succeeding breccia flow, more trees and organic matter settled to the bottom. Thus, layer upon layer of trees and organic zones were built up in a relatively short period of time (See Figures 10 and 11).

After the burial of the trees and organic debris, the water receded and/or the land was uplifted. Petrification occurred quickly before decay became pronounced. As the water drained, erosion on a large scale sculptured the landscape and exposed the petrified trees. In the course of time, glaciation also left its mark on this mountainous region.

Such an origin of the petrified forests not only accounts for the upright stance of many of the stumps, but also explains why they are without bark and limbs. It not only accounts for the organic levels at the position of the tree roots, but also explains the thinness and complexity of many levels and the occasional occurrence of stumps lacking any organic horizon at root level. The lack of agreement of ring plots between adjacent stumps and the disagreement between the components of the organic zones and the types of upright trees becomes understandable. Obviously, the evidences of water deposition, both the large-scale features such as the reversely graded beds and the small-scale features such as the microgradation between leaves in the organic levels, would be expected.

The best explanation is the simplest one that accommodates the known data. The growth position model is a simple explanation familiar to everyone, but the data reported here raise serious doubts concerning the adequacy of this model. In spite of many unanswered questions, I am convinced the transport hypothesis merits serious consideration because it seems to account for more of the available facts than the *in situ* hypothesis.

I wish to acknowledge the research done by Ivan Holmes (X-ray diffraction and infrared analyses of sediments), Lanny Fisk and Phil DeBord (palynology of organic levels) and Don Jones (complexity of organic levels—Figure 6) reported in this paper. A more quantitative and detailed report of this research on the Yellowstone Petrified Forests (from which this report has been condensed) is available from the author, Geoscience Research Inst., 600 College Ave., Berrien Springs, Michigan 49103.

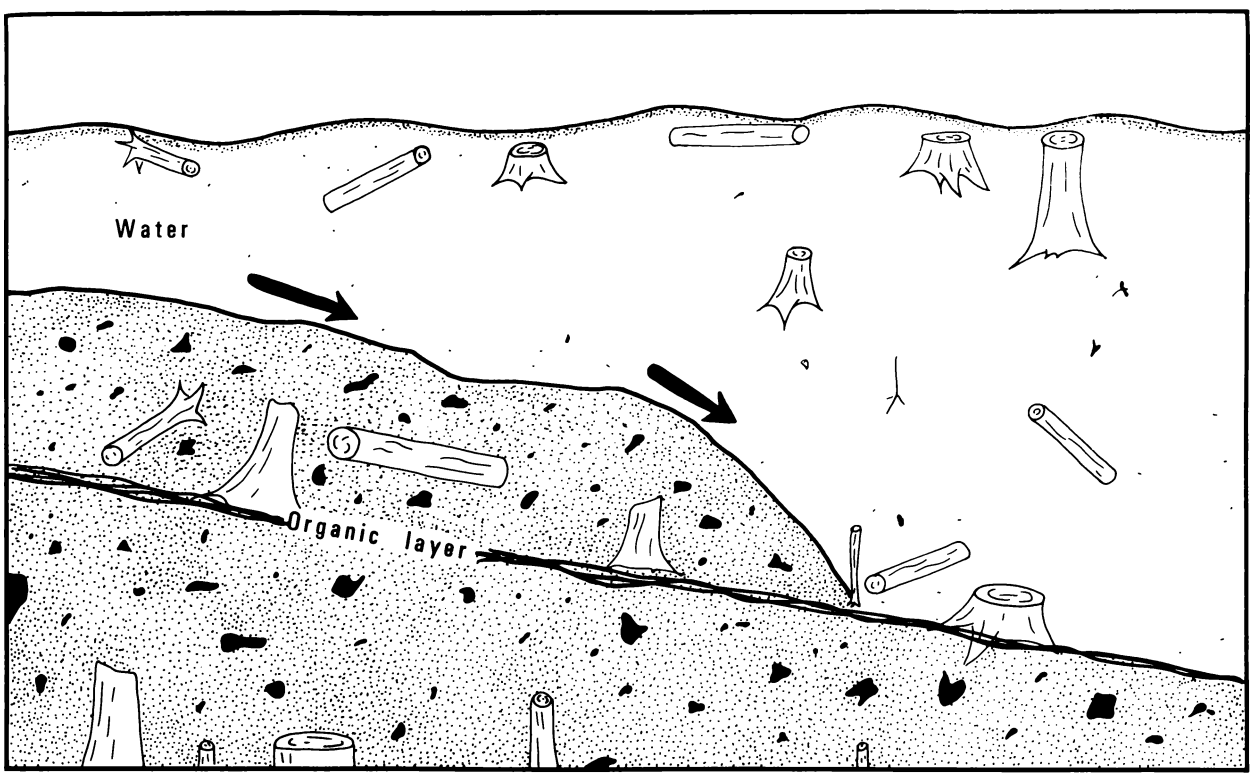


Figure 10. Proposed model for the incorporation of vertical trees into moving breccia slide.

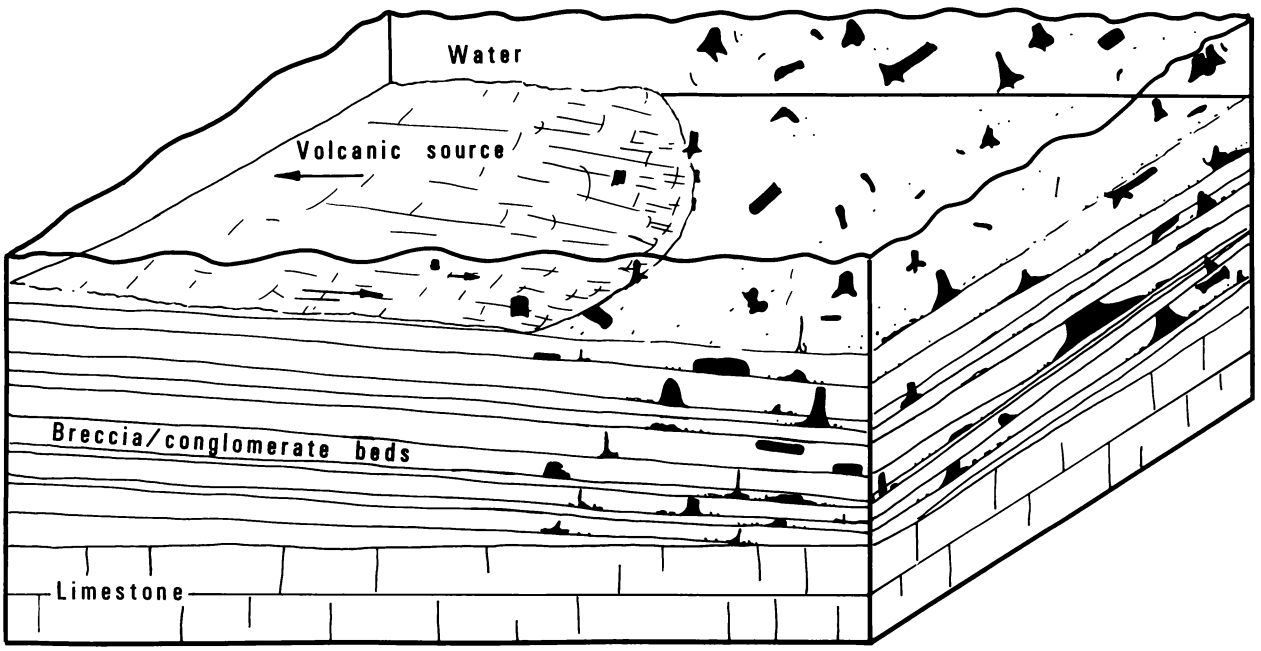


Figure 11. Block diagram illustrating the accumulation of successive beds of breccia with trees and plant debris.

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Genesis, Chapter One: A Theological Statement

by Herold Weiss

Seventh-day Adventists have always seen the conflict between science and religion as especially involving them. Adventists have understood that they are responsible for a distinctive defense against evolution — the continual observing of the fourth commandment. I have nothing against placing the Sabbath as a standard against evolution. Indeed, I think that evolutionary faith must be combatted with all the means at our command as a basic evil that stands in opposition to our faith in God as the Creator. But I do think that if we are to perceive the significance of the Sabbath for understanding the relation of God to His creation and of religion to science, we need to approach the Sabbath within the context of a careful exploration of the general theology of Creation in the Old Testament, particularly the first chapter of Genesis.

To start with, I need to point out what is already obvious, and that is that I am talking about God's creation and not God's world. There is a reason for this. The word "world," the concept "cosmos," is not found in the Old Testament. This is of supreme significance and must never be overlooked. The notion "cosmos" is a Greek notion that entered Judaism in the second century B.C., but which was unknown to the early historians and prophets of Israel.

The "world," the "cosmos," is an abstract term; it is a system held together by its own internal order. It is a totality bound together by rationally comprehensible relationships of law. As a result, there is a unified structure holding together not only heaven and earth, but also all the things in them including the gods in heaven. When the universe is conceived as "cosmos," gods and men are also bound by law. "Cosmos" first of all implies order. It also implies beauty. We still use the word in an English version: "cosmetics" are the beautifying agents. But order and beauty are abstract notions foreign to the Hebraic ancient mind. Classical Hebrew is very poor in its vocabulary for abstract notions.

I am using the word "world" and not the word "universe" because in the New Testament "cosmos" is translated "world." But in the Old Testament, the notion is unknown, for it knows nothing about a world system held together by its own internal order out-

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side of which there is no other consciousness. For the Old Testament, what is out there is not seen as a self-contained whole. It *does* at times speak of "the all," but it is always thought to be composed of created parts, primarily "heaven and earth." God, however, is definitely not included in this "all."

It is most important to keep this in mind and not to let the concept "cosmos" come in the back door when one talks about creation in the Old Testament. It is when one thinks of creation as "cosmos" that it is possible to think that the Old Testament reduces creation to something that happened in some distant past. Moreover, in terms of "cosmos," it becomes a problem to show what role God plays in the world now, for then creation and providence are considered two separate acts of God. By means of one, God organized the world long ago; by means of the other, God still has something to say about it even now.

But to do this is to destroy one of the most significant achievements of the Old Testament. I refer to the fact that the Old Testament represents man's capacity to think about the world in a nonmythological way by making clear that creation did not happen in a timeless past, and then it was done, but that the heavens, the earth and the sea keep their places and their limits not because that is the order of creation established by God in the past, but because God is holding each created element where it belongs. He is in control, and the moment he would let go, the different created parts could disappear or go away where they wished.

This Old Testament view continued to influence Judaism even after the Jews learned from the Greeks about the cosmos and about reasonable ways of constructing arguments. At the time of Christ, the rabbis were engaged in lengthy discussions as to whether or not God kept his own laws, particularly the fourth commandment. How could He cease from creating on the Sabbath? As a matter of fact, He could not, because if He did creation would cease to be.[1] Having to explain the Genesis account to people now trained in Greek logic, it became difficult for the rabbis to explain how God could rest on the Sabbath and at the same time continue to "create" the world.

To separate creation from providence is to destroy the Old Testament view of the world. That is the first thing that must be kept clearly in mind for an understanding of our topic. The second thing to be kept in mind is that the Old Testament knows of at least two ways of speaking about creation. One is poetic, hymnic. The other is didactic. Of the two, the second is theologically more precise, but the first is found more often in the Old Testament.

When Israel spoke poetically, the poetic imagery was many times quite loose. Since poetry is a universal language, it travels easily. Thus, in her poetic expression, Israel many times uses imagery from other cultures — or at least uses imagery known in other cultures and contexts. It is quite obvious that Israel knew of the way in which her neighbors spoke of creation.

Characteristic of this way of talking is the notion that at creation Yahweh had to impose His will over against the forces of chaos which tried their best to prevent the accomplishment of His will. Usually, this is described in terms of the waves of the sea rising, or roaring, against God (Ps. 46:2, 3; 89:9). But Yahweh rebuked chaos (Ps. 104:7), smote the monsters of chaos (Ps. 74:13), and now keeps them under guard (Job 7:12). In one prophetic passage (Ezek. 32:2-8), the downfall of the king of Egypt is described in language reminiscent of a Babylonian creation story. In it, Marduk struggles against Tiamat and creates the world with different parts of her body. The language of the Babylonian story rings bells behind the description of Ezekiel.

When we wish to understand the more precise, didactic statements of the Old Testament on creation, we should see them in context, so that we may clearly set forth their teaching over against what Israel's neighbors were saying. What were they saying about creation? The best preserved story comes from ancient Babylon about the time of Abraham — certainly older than the Mosaic period. It is called Enuma Elish:

When on high the heavens had not been named,
Firm ground below had not been called by name,
Naught but primordial Apsu, their begetter,
and Mummu-Tiamat, she who bore them all,
Their waters co-mingling as a single body;
No reed-hut had been matted, no marsh land had appeared,
When no gods whatever had been brought into being,
Uncalled by name, their destinies undetermined—
Then it was that the gods were formed within them.[2]

The story goes on with all sorts of episodes about the generations and the lives of the gods; finally, the young god Marduk, the god of the Babylonian empire of Hammurabi's time, confronts the ancient divinities of chaos. Marduk kills Tiamat and out of the two halves of her severed body builds heaven and earth. Man is eventually created out of clay and the blood of Tiamat's lover, the god Kingu.

A study of different selections from the Biblical world of antiquity reveals three different approaches to the origin of the world and its contents, which are also designated, as we saw in the Enuma Elish, "the heaven above, and the ground below."

One approach quite common in these stories is to see the origins of the world in terms of the process of generation. Enuma Elish uses this image for the origin of successive generations of divinities out of Tiamat. In stories coming from Sumeria and Egypt, the same generative process serves to bring about different elements within the world.

A second motif present in these stories is that creation is the outcome of a victorious struggle. The creator god has to subdue the representatives of chaos in order to be able to impose his will and bring about the state of order now known. Thus, as in Enuma Elish, creation comes about in a theogony, or a theomachy. After a struggle, the conquered divinity is killed and her body provides the essential materials for the world.

A third motif present in these stories is that the creator is a real craftsman. He knows how to use his tools and materials in order to bring forth heaven and earth. In the Enuma Elish, man is made of clay and the blood of Kingu. In a story from Egypt, Chnum, the ram-headed god, forms Pharoah and his Ka on the potter's wheel.

The language and imagery of these stories are found in the creation poetry of the Old Testament. But this has to do only with style; we have not said anything about content. Certainly, this poetic imagery is very ancient and, therefore, we had to set it forth first. Before we move on to look at what the Old Testament says about creation when it sets down its own account in the first two chapters of Genesis, I would like to draw attention to the Wisdom literature of the Old Testament.

How did the wise men of Israel look at creation? Creation does not constitute a major element in the faith of the prophets, at least they do not anchor their faith here. Their faith is anchored primarily in God's election of Abraham, and God's saving activity in the Exodus. In the prophetic view of things, creation is the first step in the historical process that leads to the Exodus. The wise men, however, stood somewhat removed from the theological traditions that saw God's activity taking place primarily in the activities of man, that is, in history. In their eyes, history was less revelatory of God's will than of the prophets.

Solomon — the cosmopolitan king — stands as the patron saint of these wise men. They participated in the cultural life of ancient civilizations, and they were aware of the possibility of understanding creation. Thus, within Israel, there developed also the search for the "how" hidden in nature. The rational interests of man were applied to nature in order to understand it. The wise men asked, how can the world be stable when founded on the unstable? (Ps. 104:5; Job 26:7; 38:6). How do meterological phenomena happen? (Job 38-40). This led to the notion, best expressed in Proverbs 8, that the world was created by Wisdom. In other words, Wis-

dom holds within herself the secret hidden in the world's structure. The wise men set forth, therefore, to discover the secret of creation in the hope that in it they would find the secret of God's being. In other words, Wisdom contained revelations into the secret of God.

The hymns of the Wisdom literature are characterized by the movement from intelligent contemplation to adoration (see Proverbs 8 or Job 28). The wise men are the first ones who, in the contemplation of the world, see in its design God's wonders exposed to man's eyes. For them, revelation is not primarily in history but in nature. God's wonders are not seen in the opening of the Red Sea, the entering into the promised land, or the holy wars of conquest. Rather, they are to be seen in nature, in the systematic arrangements, the technical problems involved in its production, the wonderousness of its design. In these things, all creation transcends itself toward God. Creation is wrapped in a secret that points the intelligent beholder toward God.

"The Old Testament knows of at least two ways of speaking about Creation. One is poetic, hymnic. The other is didactic. Of the two, the second is theologically more precise, but the first is found more often in the Old Testament.

Wisdom represented, in a way, a less theologically committed way of thinking. It was tied rather to the cultural cross-currents, the "scientific" knowledge of the time. It trusted in observation; it was a search. It represented the spirit of inquiry, a form of humanism, a trust in man's ability to find out. As said before, the historians and prophets of Israel had already kept Israel from mythological ways of thinking. But part of the credit for this must also go to the wise men who, by their strong rational approach to knowledge of the world, also prevented mythological stories to find a home in Israel in their pagan dress.

We now come to what the Old Testament says about creation didactically on the basis not of physical observation, but of theological reflection. Any Bible student can see that in the first two chapters of Genesis are found two accounts, and that their style is quite different. In contrast to the very formal style and ponderousness of Genesis 1, the lively imagery and immediacy of Genesis 2 sets up a familiar world in which man clearly occupies center stage. In truth, Genesis 2:4b-25 is not an account of the creation of the world. Here "the world" is not being considered, just man and his garden home — no background is provided. The story presupposes a barren, parched desert into which God brings His power to bear by making water spring up into rivers that water the land. The creation of man and animals is related to the ground. Man and beasts come from clay. But unlike the animals, man is animated by the breath of God Himself, not the blood of a killed divinity as in the Enuma Elish. The story as we have it leaves open the gap between the assertion that the Lord God made heaven and earth and the story's point of departure. We never find out where that barren wasteland came from.

Examining the story a bit closer, we are impressed by the artless lack of concern in describing how God created those things the author is interested in. The only thing described carefully is the creation of man and the creation of Eve; the rest is told with great economy of words and a sure command of the storyteller's art. After creating man by shaping mud of the ground and breathing into it, God planted a garden. Then He created all the animals from the ground, and He brought them to Adam to see if one would serve him as a helper. Adam named the animals, thus describing their basic characteristics and making clear that none quite suited him. Then, we hear God musing with Himself, "It is not good for man to be alone, I will provide a partner for him." Thus, for the creation of woman, God

changes His material. Instead of clay, He uses man's rib. After opening man's thorax and taking the rib, like a good mason He closes the hole in the wall of man's chest.[3] Now, the goal of creation has been reached. Everything needed by man, he has at hand. The thrust of the story is to establish relationships in man's world. Everything is for man: the garden, the beasts, the woman. From God, man receives also a responsibility and a prohibition. He is to till the ground (2:15), and he is to abstain from the tree of the knowledge of good and evil (2:17). God has not created evil, but evil is a possibility in a world characterized by man's freedom and knowledge. This account is sometimes called patriarchal because of its parochial concerns with man.

By contrast, Genesis 1 represents a carefully worked-out statement with definite aims in view. Its style is certainly architectonic, even if somewhat monotonous. Its symmetry is not quite perfect, but its intention is clear. It sets forth a doctrine and a law: the doctrine of creation and the law of the Sabbath rest. Even a quick reading of the story makes clear that it has been told in order to establish the sanctity of the Sabbath. The story starts with the creation of time, the creation of a day, and ends with the creation of Holy Time, the Sabbath.

Before we look more closely at the peculiarities of the story, we may notice some points of contact between this story and the one in Genesis 2. Like the patriarchal story, this one (for convenience, let us call it sacerdotal) also has a headline, only that now the order of the created parts is reversed. In Genesis 2:4b, we read God made "the earth and the heavens"; in Genesis 1:1, we read that He created the "heaven and the earth." Whichever the order, the headline is here; serving as a clef sign on a musical score, it sets the stage for what is to follow.

Most significantly, when the two headlines are compared, we find not only the change in the order of the parts but also the change of verbs. In 2:4b, we read that God "made." The verb means to make, manufacture, fix, put up. The participial form of the verb is used to say "My Maker." In Genesis 2:7 and 19, we read that God formed, or "shaped," man and the animals with mud of the ground. In contrast, Genesis 1:1 affirms that God "created." This is a pure theological word reserved for God's creative activity. It is never used with a subject other than God. *Bara'* makes clear that in order to create, God is not dependent upon matter. In creating, God is independent of His creation; He is not limited by the kinds of material available to Him. This is a magnificent declaration, but its full splendor is somewhat dimmed because the author does not quite close the gap between the headline and the story.

Just as the patriarchal story fails to close the gap between the statement that God made the earth and the heavens and the description of God's creative activity as the bringing forth of water into an arid, wasted, desert, so also the sacerdotal story does not close the gap between Yahweh's incomparable act of creation out of nothing and the primeval waters of darkness which are there waiting for, or opposing, the spirit of God that broods over them like a chicken over eggs.[4]

By its magnificent headline, Genesis 1 makes impossible any infiltration of the world of mythology into the world of the Bible. Here God and the world He creates are related and yet kept apart by God's world. We do not see here God working over clay like a potter, we do not have here God closing over man's thorax like a mason who closes a breach in the wall. Here God touches nothing and is dependent on nothing. He only proclaims His will and the word that leaves His lips, like an arrow that is sent forth from an outstretched bow, accomplishes its appointed task. By the theology of the word, Genesis puts aside theogony and pantheism by one effective stroke. The world is not the outcome of a struggle between gods, neither is it made out of divine matter. The world is the expression of God's will, so that God can pronounce it good, but it is in no sense divine. This insight given to us by the Old Testament is never surpassed by the New Testament. One after another, different parts of the world are brought into existence by the divine Word: heaven, earth, sea, stars, plants and animals. They all come forth at the call of

God. But God remains in perfect isolation within Himself over against all of them.

As I said before, the story is told in order to establish a doctrine and proclaim a law. But before we analyze these two, I would like to point out two other things that are clear in the story. One is that the story is polemical; it carries on an argument against false gods. The other is that it represents the best scientific knowledge of the time and presents us with a fully secular world.

The polemic is quietly waged against the sun, the moon and the stars. It would seem to everyone that it is impossible to have light without the sun, and even more so it would seem impossible to have a day without the solar system. But the story makes clear that a day, the basic unit of time, is not the creation of the solar system. The sun, the moon and the stars do not create days and nights; they only serve to count them. They are not the powers that create time; they are only the instruments for its measuring. Their function is not to rule over man's destiny, but only to serve man as he worships God at the appropriate times weekly, monthly and yearly. The polemical thrust is most apparent in that their names are avoided. We only read the rather derogatory designations, "that greater" and "that lesser" light.

"On account of our own difficulties, it is difficult for us to appreciate that here the scientific and the theological are interwoven without tensions."

The secular world is apparent in that God leaves His imprint in the world by creating the Sabbath, but He is essentially absent from the world. The world is presented according to the best cosmological knowledge of the time. But the amazing thing here is that it is futile and counterproductive to try to separate the theological from the "scientific." On account of our own difficulties, it is difficult for us to appreciate that here the scientific and the theological are interwoven without tensions. The two things are interwoven in such a way that there is not one "purely scientific" or "purely theological" statement. Here theology and science can work together in harmony. At least, we are unable to detect any tensions. The point is not that the scientific knowledge of that time is the ultimate and true description of the natural world. It certainly is not. As a matter of fact, the cosmology of Genesis has to be judged "pre-scientific" and primitive. But by means of this pre-scientific knowledge, the men of faith in the Old Testament were able to destroy the mythological world view with all its false gods. And, ultimately, that is what it is all about: a struggle against idolatry.

I call this world secular because it is a world in which God is not *naturally* present. I call this world scientific because it represents the best kind of logic based on observation of the reality in which man lives. It is based on the understanding of the firmament as a solid vault that keeps the waters above stored. The vault has windows through which water or light may come through. The story has a logic of its own. It has separated three spaces which three kinds of beings occupy. It has separated fish and fowl from land animals. Thus, the logic of the story is that three kinds of things, in order to be, must have three homes. Thus, on the first three days, God created three homes, and on the second three days, God created the inhabitants of those homes. If we were to write the story today in terms of our scientific knowledge, we would use a different logic. Scientific logic would prevent us from having days before the solar system and would prevent us from having vegetation before the sun. In fact, it would prevent us from having a solid firmament separating the waters above from the waters below. Ours is a scientific logic based on better instruments for observation. But ours is also a logic that refuses to allow theology to inform it. In the creation story, man is made in the image of God. In modern science, man is made in the image of the biological world. When man is presented in this way by a "scientific faith," then the struggle between faith

and science is unavoidable. Unlike God, science cannot legitimately claim to be the object of faith.

This brings us back to the two main points of the story: the doctrine of creation, and the law of the Sabbath. The story makes clear that God's presence in the world is to be found in the "image" of man and the "sanctity" of the Sabbath. The "image" stands for what it is an image of. Because of this characteristic, the "image" tends to attract unto itself that which should be given to that for which it stands. Thus, in the story of Nebuchadnezzar's image (Dan. 3:1-30), the three Hebrew youths were required to worship the image that stood for Nebuchadnezzar. The point, for our purposes, is that the image stands for what it represents. Thus, man as the "image" of God stands for God within heaven and earth while God remains outside. Man within creation is a signal that points outside to the Creator. Genesis 1:27

"The doctrine of creation in Genesis 1 is a carefully considered didactic, theological statement, to be distinguished from poetic imagery, or 'scientific' investigation also found in the Old Testament."

clearly interprets the role of man as God's image: He has dominion over the fish of the sea, the fowl of the air, and over the cattle and over all the earth. Here all things in nature have been divested of domain or power. That was the characteristic way of seeing the world for ancient man. Among Israel's neighbors everything in nature had a mysterious divine power — especially the sun, the moon and the stars. But here, they are all servants of man. Man is presented free from the powers of nature.

Two things are particularly striking. On the one hand, man is very much part of the created world. Like the whole of creation, he owes his existence to the Creator. He is made the same day the other animals of the land are made. He receives with the animal world the blessing of fertility. He eats the same food that the other animals eat as God bountifully provides. But on the other hand, man is set apart from the other animals. Throughout the story, God acts forcefully and without second thoughts. His word forthrightly accomplishes its mission. But for the creation of man, God stands aside and reflects within Himself. After some deliberation, He announces: "Let us make man in our image." In the whole process of bringing heaven and earth into being, the decision to give man God's image was the hardest one to make. To set man apart within creation and to give him dominion over it involved a risk that needed to be carefully considered. As a result of God's decision, however, man is bound to the world in two ways: he is part of the world, and he is ruler of the world.

But he is ruler of the world for God. He is not the Creator: he is His "image," His representative; he is the one standing in for the Creator. That is the doctrine of creation in the Old Testament. It establishes a clearly defined relationship between God, the world and man within the world. Man's life is part of the life of the world, but man stands in the world as the "image" of God. Nothing within heaven and earth has life or dominion in or by itself. There are no powers hidden in nature controlling the world. Neither impersonal laws nor personal divine intermediaries run the world. God creates the world and man in His "image."

We now find ourselves in a position from which to see the relationship of the Sabbath to God's creation. There is no question that the logic of the story of creation in Genesis 1 is to bring out the role of the Sabbath rest. But in order to understand this role, we needed to see that God's creation is not a "cosmos." God's presence in creation was not a past event. The moment God would cease from creating, the world would instantly desintegrate. The mountains, the sea, the stars would leave their appointed functions and limits and go their merry way. The

doctrine of creation in Genesis 1 is a carefully considered didactic, theological statement, to be distinguished from poetic imagery, or "scientific" investigation also found in the Old Testament. Also to be kept in mind is that the story of creation carries on a clear-cut polemic against a mythological understanding of the world where brooks, mountains, animals, stars or trees have "powers" of their own. Here we have a secular world. God is clearly outside of it, but He left His mark in it when He trusted man with His image.

The story starts with the creation of time, a day, and ends with the creation of holy time, the Sabbath. On the Sabbath, God finishes His work and rests. How is this to be understood? Is not this a contradiction? As noticed above, Greek logic already found it to be such. Did He finish His work in the morning and rest in the afternoon? No, God's creation was completed with the blessed day. In other words, by resting on the seventh day, God placed within creation holy time for man to rest in. That is the logic of the story: first God creates places or homes, and then, in the corresponding second set of three, He creates what inhabits those homes. As a capstone for the two series of three, He creates a home for man to remember that he is the "image" of the Creator (see figure p. 62). Or better yet, He creates the Sabbath in order to guarantee to man that God's creation stands on the basis of God's blessing.

The Sabbath is the sign of God's effective creative power. Just as the rainbow was the sign of the covenant with Noah, and circumcision was the sign of the covenant with Abraham, the Sabbath is the sign of the covenant with creation. God's creation is not a self-sustaining system maintained by inner self-winding mechanisms, eternal laws or personal intermediaries. Nature, as such, is an abstraction about which the Old Testament knows nothing at all. Theologically speaking, there is nothing in the world that guarantees that a minute from now what we call "the universe" is to be organized the way it is organized this minute. To believe in creation is not to believe that God created the world some years ago in some golden age of the past. This is to deny the Old Testament triumph over mythology. To believe in creation is to believe that God creates "the world" each moment, and that if He did not, the world would collapse any moment. The world is not an organism running on its own ruled by natural law. To believe that the world is ruled by natural or psychological laws is idolatry, and that is what Genesis 1 is against! The world is created by God. His rule is what keeps the stars in their orbits, the sea within its limits and the waters above divided from the waters below. Man, living in the space between the waters, may rest secure; he need not worry about Creation's falling apart. Mankind may rest because God is doing His work. The world is secular; no divine power within it keeps it running. God does. Therefore, people who trust God may rest.

The literature of antiquity has many versions of the story of the flood. The flood serves as a warning that chaos is an ever-present possibility. In the mythological world of antiquity, the flood is associated with some divine oversight. Here the set limits assigned to the waters are broken, and the waters above and the waters below break loose and destroy humanity. In the Old Testament story, however, it is quite clear that in the flood God has in no way lost control of His creation. It is not the case that things went berserk because God got distracted from His job of keeping the world going. God was engaged in a work of judgment. It is not insignificant that the one used by God to save humanity through the waters of destruction was called Noah. All Hebrew names had significant things to say about their bearers. Noah means "rest." The significance of the name is obvious. At a time when the forces of chaos seemed to be robbing the world away from God's effective control, Noah was at ease. He rested. Contrary to all circumstantial evidence, God was still upholding His creation, even in the midst of the invasion of the waters of chaos. That is why Noah was called Noah. He was the personification of God's covenant with His creation. He rested secure in a world that was still in God's control.

The seas may try to roar, the forces of

chaos may wish to break the ordinances of the Creator, but God rests, and men and women may rest, because the power of God still upholds His own creation. The Sabbath is the sign that this secular world, where God is absent, still is ruled by God.

The Biblical Story of the Creation of the World: A Literary Analysis of Its Structure

"Science" at the Service of Theology

1st Day Gen. 1:3-5 Light and darkness God creates a day	4th Day Gen. 1:14-19 The inhabitants of light and darkness God creates the greater light, the lesser light and the stars to count days, seasons and years
2nd Day Gen. 1:6-8 The firmament God creates the air space between the waters above and below	5th Day Gen. 1:20-23 The inhabitants of the water and the air God creates the fish and the fowl
3rd Day Gen. 1:9-13 The land to stand on God creates that which stands on the ground:vegetation	6th Day Gen. 1:24-31 The inhabitants of the land God creates all land animals and man, and gives to all animals vegetation for food
7th Day Gen. 2:2-3 Holy time - the Blessed Day God finishes his work and rests	

Gen. 1:1	Headline:	In the beginning God created the heaven and the earth
Gen. 2:1	Summary:	Thus the heavens and the earth were finished
Gen. 2:4a	Colophon:	These are the generations of the heavens and the earth when they were created
Gen. 1:2		A poetic digression

NOTES AND REFERENCES*

1. As is well known, the Old Testament has two versions of the ten commandments. In the Deuteronomic version, the Sabbath is not related to creation, but to the Exodus experience under God's saving power. Deut. 5:12-15.

2. Different rabbis worked out different solutions. See Philo, *On the Cherubim*, 86-90, and *Allegorical Interpretation of the Law*, I. 5-6. Also *Exodos Rabbah*, 30.9.

3. James B. Prichard, *Ancient Near Eastern Texts* (Princeton: Princeton University Press, 1955), pp. 60-72.

4. The image is found in the original Hebrew.

5. Gen. 2:2 is a very obscure text, most difficult to translate with certainty. It is clear, however, that there are ancient poetic expressions informing the text.

* This essay is based on a lecture delivered on April 15, 1977, in Seattle, at the Green Lake church Spring Retreat. I wish to thank the members of the church who invited me to be the speaker for their Spring Retreat, who by their assignment and their stimulating conversations forced me to think again on this question.

Responses from Readers

On Black Unions

To the Editors: About three years ago a black female was elected Student Association President at SMC, which has a very small percentage of blacks. On a recent anonymous survey taken at the Seminary, 110-112 students said they "would be happy to share my church facilities or even my pulpit with an SDA minister of a different skin color than mine." Only two respondents — one white and one black — gave no positive response.

The point is this: I hope that the move toward black unions will not make permanent a separation which, in time, would correct itself with the arrival of a more enlightened generation.

Tim Crosby
Berrien Springs, Michigan

On Paxton

To the Editors: Having read the Paxton book, having attended the Loma Linda discussion session with Paxton, and now having read the Paxton material in SPECTRUM (Vol. 9, No. 3), I wish to express the thought that has dominated my mind throughout — a logical point perhaps appropriate for a nontheologian, an English teacher.

As Dr. LaRondelle suggests in his review, Paxton poses a false dilemma. Adventism, he says, is moving away from Reformation doctrine towards Catholic doctrine on the item of faith. Yet LaRondelle and the others have been at great pains to find Adventism agreeing with Luther and Calvin. All this is interesting but is not the answer to Paxton. Try this:

"Paxton, you have posed a false dilemma. We reject it. A third alternative, adopted by Adventism, is to be based on scripture only. It is true that there has been dialogue within Adventism on the faith issues, but the final word has not yet been written. Hopefully, it soon will be, based on some *precise* definitions. In the meantime, recall that the Adventist diversions from an incomplete Reformation, relating to the Sabbath, the sanctuary, the state of the dead and creationism, are of long standing and great importance. Have you thought of 'the shaking of Protestantism'?"

The rule: discuss the issue on *your* grounds, not on your opponent's grounds.

Richard B. Lewis
Loma Linda University

To the Editors: In all of the controversy between Geoffrey Paxton and his critics, there can be no more luminous demonstration of the truth of Paxton's charge of perfectionism among Adventist leaders than was given by Herbert Douglass in his denial of that charge in SPECTRUM (Vol. 9, No. 3): "C. M. Maxwell, Morris Venden, Lawrence Max-

well, J. L. Tucker, K. H. Wood, R. H Pierson, Neal Wilson, Hans LaRondelle, this reviewer, and a host of other current leaders are not perfectionists. But they do believe that by God's help men and women can live without sinning and for such people God waits!"

George W. Colvin, Jr.
Riverside, California

To the Editors: I appreciated the discussion of Paxton's *The Shaking of Adventism* in SPECTRUM, Vol. 9, No. 3. Important issues are raised and it is hoped that the church will make a prayerful and earnest study of these so that our witness to the world will be as united as possible. This study should not be confined to the higher echelons of the church but should be carried on by the priesthood of believers.

When a self-styled "Babylonian" analyzes the soteriological development and present stance of the church, it is only natural that our defenses would go up. With a conviction that God has called us to be the remnant to give the final message to the world, could we be in need of correction on our presentation of the gospel? Past experience should have taught us that being God's prophetic mouthpiece and infallibility do not always go hand in hand. Will we be humble enough to learn from this sympathetic critic?

Has the *Review and Herald* opened itself to some legitimate criticism during the 1970s? Has the cross of Christ been the great centre of attraction? Has Christ been set forth firstly as Substitute and Surety and then as Example? Has the impression perhaps been left that character development, sanctification and perfection are the root rather than the fruit of salvation? Could it be that the emphasis has been anthropocentric rather than Christocentric? Have we been exceedingly careful in presenting the human nature of Christ? These questions are asked in loving concern.

What is God waiting for? Is God primarily waiting for people who with His help can "live without sinning" (Douglass). We must decide either that God is dissatisfied with us because of our imperfection and sinfulness and will only be satisfied when we reach the place that we are collectively "living without sinning," or that God is satisfied with us fully when we believe in His Son, our Substitute, Surety and Righteousness in spite of our imperfection. "When we realize that our hope of glory is Christ, that we are complete in him, we shall rejoice with joy unspeakable and full of glory" (E. G. W., *R & H,* April 4, 1893). What a shout of glory would go around the world if our dear members suddenly discovered that God was satisfied with repentant sinners and that Christ was our only hope. From this sense of acceptance, such a fruitage of sanctification would be seen that "Christ Our Righteousness" would become the all-absorbing theme. Let us suggest that God is waiting not so much for people who "live without sinning," as He is for modern Israel to enter into His rest by faith and to accept fully the merits of our Lord and Saviour Jesus Christ. When this happens, we might be humble enough for the loud cry to begin.

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