

The Biblical Chronologist

WHAT HAS BEEN IS REMOTE AND EXCEEDINGLY MYSTERIOUS. WHO CAN DISCOVER IT?
(Ecclesiastes 7:24)

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The Crater at Mt. Yeroham – Part I

Now Mount Sinai was all in smoke because the LORD descended upon it in fire; and its smoke ascended like the smoke of a furnace, and the whole mountain quaked violently.

Exodus 19:18.

I am a bit slow at times.

I have been laboring to understand why human life spans, which were 925 years on average before Noah's Flood, plummeted to just 75 years following the Flood.

I have been working on this problem for quite some time. Lab notes describing my earliest life span experiments date back to 1982. I was 27 years old, and in the middle of a Ph.D. program in nuclear physics at the time.

My Ph.D. physics program, as you might well imagine, had nothing to do with human life spans. I had entered the Nuclear Physics program at the University of Toronto, Canada, because a few nuclear physicists (including my supervisor, Dr. Litherland) had recently figured out how to use nuclear accelerators to do radiometric dating, including radiocarbon dating. My purpose in entering this program was to try to resolve the apparent discrepancies between radiometric dating methods and Biblical chronology—a goal which I continued to pursue, and finally reached two decades later, long after I had graduated from the University of Toronto.¹ As I labored over my Ph.D. research, courses, and student teaching responsibilities, I snatched rare spare moments to work on the human longevity question in the rough basement of

¹Gerald E. Aardsma, "A Unification of Pre-Flood Chronology," *The Biblical Chronologist* 5.2 (March/April 1999): 1–18.

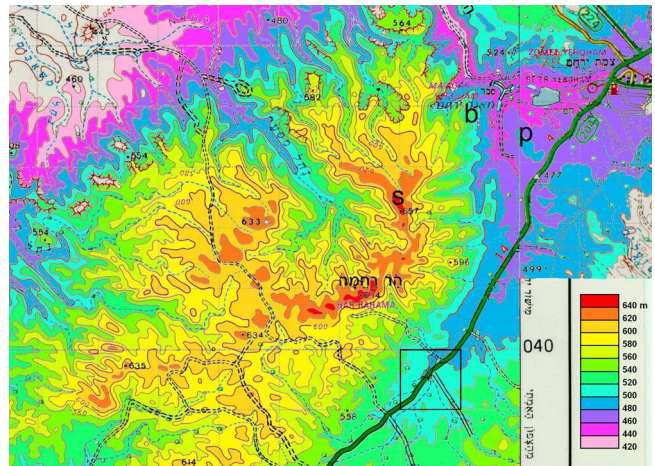


Figure 1: Part of two topographical maps of Israel I pieced together and colored in, in preparation for a trip to the site in June, 2000. The rim of the crater on the mountain stands out as a red/orange ring. [The distance scale is given by ruled squares 1 kilometer on a side. I have darkened the outline of one square to make the scale easier to see. My color versus altitude scale is shown at bottom right. The 's' (summit) marks the highest point on the crater rim (557 meters). The 'p' marks a portion of the extensive plain at the base of the mountain where the Israelites camped while at Sinai. The 'b' (*bamah*) marks the location of the altar built by Moses at the foot of the mountain.]

our older rented home. My wife and young children occupied the other rooms in that little house.

I am now 53. That means I have been probing the Biblical longevity question experimentally, as time and circumstances have permitted, for twenty-six years.

As my earliest theoretical probings predate my first experimental efforts by several years, I must confess that I have been working on this problem for over half my life. And, though very great progress has been made, I have not yet found the solution for which I have so long been seeking.

But I am not referring to my work on human longevity when I say that I am a bit slow at times. In fact, my longevity research has progressed about as rapidly as one might hope, even if the task has turned out to be much larger than I imagined when I embarked upon it those many years ago. To understand the cause of our lost longevity—and thereby hopefully to find a cure for the disease we presently call “aging”—has been my number-one research priority since 2000. God willing, it will remain my number-one research priority until “aging” has been defeated, or “aging” has defeated me.

As you know, I temporarily halted publication of *The Biblical Chronologist* at the end of 2002. I did so to free up more of my time for longevity research, feeling that the time was right for an all-out assault on this problem. I hoped at the time to resume publication of *The Biblical Chronologist* one year later. That was over five years ago...

But the long delay in getting this next issue of *The Biblical Chronologist* to you is also not the reason I say that I am sometimes a bit slow. With “aging” claiming the lives of over 200,000 people per day, it is only right that publication of *The Biblical Chronologist* should take a back seat to longevity research so long as there exists reasonable grounds for believing that the cure for “aging” is near at hand, and reasonable hope of discovering that cure.

Early in 2005 I began to experience a curious loss of strength in my arms, hands, and eventually my legs. This lasted a few weeks, and then seemed to resolve. But then a few weeks later I was struck with another bout of weakness. Cycles of weakness and apparent improvement continued on and off throughout 2005 and 2006. But each time the weakness grew worse and the recovery less. By the end of 2006 my wife, Helen, had to help me dress each day, I was unable to get up from chairs on my own, and I could not pour water from one container to another in the chemistry laboratory.

My condition was finally diagnosed at the beginning of 2007. I learned I had CIDP, a rare autoimmune neurological disease. CIDP has no medical cure, but its symptoms can be alleviated via medication. I was on medication for CIDP throughout 2007. My strength rapidly began to return.



Figure 2: A sample of the ubiquitous pottery shards found littering the plain before Mount Yeroham/Sinai.

But the medication put an increasing strain on my powers of concentration as the year progressed.

CIDP slowed me down, for sure. But I am not referring to CIDP, either, when I say that I am a bit slow at times.

I am referring to the lateness with which I came to understand the nature of the crater which one should expect at Mount Yeroham.

Review

Mount Yeroham is the Biblical Mount Sinai.² The world has yet to acknowledge this fact, but that just shows that I am not alone in being a bit slow at times.

The Bible nowhere mentions a crater at Mount Sinai that I am aware of. What the Bible mentions, repeatedly, is that when God visited Mount Sinai, at the time when the Ten Commandments were given to Moses, all sorts of volcano-like phenomena accompanied His visit. For example: “and the mountain burned with fire to the very heart of the heavens: darkness, cloud and thick gloom”³; “and its smoke ascended like the smoke of a furnace, and the whole mountain quaked violently”⁴; “And all the people perceived the thunder and the lightning flashes and the sound of the trumpet and the mountain smoking”⁵.

²Gerald E. Aardsma, “Yeroham: the True Mount Sinai,” *The Biblical Chronologist* 6.4 (July/August 2000): 1–11.

³Deuteronomy 4:11b, NASB.

⁴Exodus 19:18b, NASB.

⁵Exodus 20:18a, NASB.

As you may recall, I discovered that Mount Yeroham is the Biblical Mount Sinai because of the abundant Exodus pottery found there (Figure 2).⁶ I stumbled upon the very large crater at Mount Yeroham/Sinai when I colored in a topographical map of the mountain (Figure 1) in preparation for a field trip to the site in June, 2000.⁷

It seemed, from the start, a great deal more than merely coincidental that a crater—a rare feature for Israel—should exist at this very mountain where the Bible tells us that all this volcano-like activity took place. So Philip (then cameraman, now son-in-law) and I went looking for field evidence that the crater at Mount Yeroham/Sinai was due to a volcano.

We came back from our exploration of the crater hot, tired, thirsty, and empty-handed, as I reported in *The Biblical Chronologist* a half year later:⁸

... if the crater behind Mt. Yeroham is of volcanic origin, it is doing a very good job of concealing that fact, to amateur eyes at least. We had uncovered not so much as a single pebble of volcanic origin inside the crater.

The volcano theory of the origin of the crater at Mount Sinai had, in fact, been pretty much falsified by our one-day excursion into the crater. This seemed to me, at the time, to leave the idea that the crater was purely an erosional feature as the only alternative.

But this was not very satisfying. Why should this ‘erosional’ feature be so conspicuously crater-shaped? Why did the topographical map fail to show any obvious ‘delta’ at the base of the mountain, where all the water-eroded sands and gravels of the previous mountaintop should have been deposited? And why should such a rare, crater-like feature be located *precisely* where, from the Biblical account of God’s visit to Sinai, one might ex-

pect to find such a thing—right on the top of the mountain?

Further Light

The mystery of the origin of the crater at Mount Yeroham/Sinai remained in this unsettled state, niggling away at me for some time. I can no longer remember just how long. But one day, some years ago, further light suddenly dawned.

Note that the Bible never says anything about a volcano at Sinai. It only records volcano-like phenomena there. Is there any other way that craters and volcano-like phenomena can be produced?

Yes. There is another whole class of events which produces craters accompanied by volcano-like phenomena—the impact class.

Craters are produced when space rocks, such as asteroids or comets, strike the earth. Space rocks heat up as they pass through Earth’s atmosphere, and may sometimes be seen as brilliant fireballs streaking through the sky as they plummet toward the earth.

The Bible does not mention a volcano blowing up at Sinai, but it does clearly mention fire from the sky falling upon the mountain. It says: “Mount Sinai was all in smoke because the LORD descended upon it in fire”.⁹ This says, pretty clearly, that the cause of the volcano-like phenomena at Sinai came from above, not from beneath the mountain.

I had clearly missed the cue on this one. The crater was a result of God descending upon the mountain in fire, not a result of volcanic magma erupting from beneath the surface. The Biblical description of the event requires that we assign this crater to the impact category, not the volcano category. I should not have been looking for signs of volcanism in the crater at Yeroham/Sinai—I should have been looking for signs of impact.

Biblical Evidence of Impact at Mount Sinai

We know a great deal about impact events today—how they are caused, how frequently they happen, the amounts of energy they release, the physical phenomena associated with them due to this release of energy, the different sorts of craters they

⁶Gerald E. Aardsma, “Yeroham—The True Mt. Sinai?” *The Biblical Chronologist* 1.6 (November/December 1995): 1–8.

⁷Gerald E. Aardsma, “Report on the Excursion to Mt. Yeroham – Part II,” *The Biblical Chronologist* 6.6 (November/December 2000): 3.

⁸Gerald E. Aardsma, “Report on the Excursion to Mt. Yeroham – Part III,” *The Biblical Chronologist* 7.1 (January/February 2001): 7.

⁹Exodus 19:18, NASB.

produce, and much more—as a quick search on the Internet will show. Not so the ancient Israelites. We may safely assume they knew nothing at all about such events.

Most of what we know about energetic impact events today has been learned as a result of nuclear weapons tests, for the energy in the sorts of impacts which produce large craters is comparable to the energy in an atomic bomb. Our other major source of information about large impacts has been through the study of impact craters on the moon and other planets of the solar system.

Neither of these two modern sources of information regarding impacts were available to the Israelites who witnessed the Sinai event. Thus their observations and experience throughout the event were untarnished by preconception springing from theory or previous experience. They were naive observers, from a scientific viewpoint. It is therefore all the more compelling when we find that what they tell us harmonizes simply and naturally with what one knows today to expect from large impact events.

1. Descending Fireball.

I have already mentioned that space rocks hurtling through the atmosphere are heated by friction so that they become very hot and luminous. Sometimes they outshine the sun.

The Biblical text provides evidence that such a fireball was seen by the Israelites in the words already quoted above, “the LORD descended upon it in fire”¹⁰.

2. Order of Events.

This visible, descending fireball is the first manifestation of an impending impact. The impact results from the space rock colliding with the surface of the earth after it has passed through the atmosphere. Thus the descending fireball must come before any other impact-associated phenomenon.

The Biblical text reflects this order of events. It records, “Now Mount Sinai was all in smoke *because* the LORD descended upon it in fire” [my emphasis]¹¹. That is, the mountain went up in smoke because, first of all, fire descended upon it

from above.

3. Impact Fireball.

In a typical impact, the space rock is moving at very high speed when it strikes the surface. A typical impact speed is 20 kilometers per second (45,000 miles per hour). The collision between the space rock and earth is not itself responsible for the impact crater, as if the space rock had gouged the surface of the earth. The space rock does gouge or plow its way into the surface of the earth, but one might almost think of this as a tiny affair. The real damage takes place due to the sudden conversion of the space rock’s energy of motion to heat energy as it is rapidly decelerated by the solid earth. So much heat is generated that the space rock and part of the target are simply vaporized. The result is as if one had buried an atomic bomb at the same depth beneath the surface and then detonated it. A huge explosion results. It is this explosive release of energy which excavates the crater and produces other impact-related phenomena.

The explosion produces a very hot fireball coming back up out of the crater. This impact fireball (not to be confused with the descending fireball) rapidly ascends to great height, producing a classic mushroom cloud, familiar to most modern eyes from pictures of nuclear weapons tests.

Deuteronomy 4:11 appears to record this aspect of the Sinai impact. It says, “and the mountain burned with fire to the very heart of the heavens”. And Deuteronomy 4:36 says, “on earth He let you see His great fire”.

4. Earthquake.

The enormous shockwave produced by the impact explosion unavoidably results in an earthquake propagating outward from the impact site.

The Sinai event was accompanied by a severe earthquake. Exodus 19:18 records, “and the whole mountain quaked violently”.

5. Lightning, Thunder.

The impact fireball which rises from the crater is accompanied by lightning, which in turn produces thunder. This has been observed in nuclear weapons tests.

The Israelites observed thunder and lightning with the Sinai event. Exodus 19:16 records that “there was thunder and lightning flashes”, and Ex-

¹⁰Exodus 19:18, NASB.

¹¹Exodus 19:18, NASB.

odus 20:18 says, “And all the people perceived the thunder and the lightning flashes...”.

6. Cloud, Smoke, Darkness.

The crater is excavated by rocks, gravels, dust, melted target rocks, and hot vaporized material spewing from the impact site together with the impact fireball as a result of the explosion. This fractured, pulverized, and heated matter is called ejecta. The ejecta goes up from the crater in the shape of an inverted cone, following ballistic trajectories. The fastest ejected material comes from the center of the crater, and may exceed the escape velocity. Out at the rim of the crater ejected material moves much more slowly and may be represented simply by a flap of overturned material on top of the rim.

The lofting of so much pulverized matter into the atmosphere produces a cloud of dust, smoke and vapor about the crater. An observer who actually experienced the daytime Nagasaki atomic bombing described what he saw following the detonation in these words: “The sky is pitch dark, covered with something like cloud or smoke. Under that blackness there was, hanging over the ground, a yellow-brown smoke.”¹²

Moses recorded that “Mount Sinai was all in smoke...and its smoke ascended like the smoke of a furnace” (Exodus 19:18). The Israelites saw “a thick cloud upon the mountain” (Exodus 19:16) and experienced “the cloud and...the thick gloom” (Deuteronomy 5:22).

Notice that, as with the eye-witness account of the bombing of Nagasaki, above, both “cloud” and “smoke” are used to describe what the Israelites observed. And, as with Nagasaki, though it was morning (Exodus 19:16) they were in darkness. Deuteronomy 5:23 records, “you heard the voice from the midst of the darkness, while the mountain was burning with fire”. And Deuteronomy 4:11 says, “the mountain burned with fire to the very heart of the heavens: darkness, cloud, and thick gloom”.

7. Trumpet Sound.

A large impact produces very high temperatures in the crater, sufficient to vaporize both impactor and target rocks as mentioned above.

The target rocks in the case of the Sinai crater appeared to be simply limestone to my amateur eyes, though I would be unable to exclude the possible presence of other carbonates, such as dolomite. Some were very soft and nearly pure white. All gave rapid effervescence when tested with a drop of dilute hydrochloric acid—the usual simple test for limestone.

On heating, limestone decomposes to calcium oxide (lime) and carbon dioxide gas. A large impact in limestone strata will, therefore, produce a great deal of hot carbon dioxide gas from decomposition of the limestone. This gas will be produced within the strata lining the crater to whatever depth these strata are heated above their decomposition temperature by the impact shock-wave and subsequent propagation of heat within these strata. This will result in hot carbon dioxide gas escaping under pressure from fissures in the strata lining the crater. The sound of pressurized gases escaping from fissures has potential to be very loud.

The Israelites heard what the Bible describes as “a very loud trumpet sound” (Exodus 19:16) immediately following the descent of the fireball on Sinai. This sound intensified for a short while following the impact: “the sound of the trumpet grew louder and louder” (Exodus 19:19).

8. Impact Melt.

Calcium oxide (lime), produced by decomposition of limestone, melts, producing a colorless liquid. In a large impact, melted rock is likely to remain behind within the crater. It will flow down the walls and pool in low spots on the floor of the crater. This molten pool may eventually drain away into fissures, or may solidify into a glassy solid on cooling. Solidification may occur fairly soon after impact because the melting point of calcium oxide is very high—2580°C.

Exodus 24:10 records that Moses and a group of others who accompanied him up the mountain some time following the Sinai event saw what “appeared to be a pavement of sapphire, as clear as the sky itself”.

Conclusion

These eight textual/historical evidences do not exhaust the historical material touching on this event

¹²John S. Lewis, *Rain of Iron and Ice*, (New York: Helix Books, 1996), 57.



Figure 3: The view down into the crater as seen from the northeast rim looking west-northwest. Part of the near rim, from which the photo was taken, can be seen as the bright rocks in the lower right corner. Elevation drops precipitously into the crater beyond this rim. A dark shadow is cast down into the crater by the rim in this early morning photo. (The photo was taken at 7:43 a.m. on Saturday June 24, 2000.) The distance from the near rim to where the wadi disappears around the corner, heading for the breakout, far below, is about 1 kilometer. Change in elevation from the rim to the wadi is about 100 meters (i.e., a football field stood on end). Note that a mountaintop filled all this view prior to God’s descent on this mountain ca. 2450 B.C.

in the Bible, but they seem sufficient to show that what the Israelites experienced at Sinai was, in fact, an energetic impact event.

I need to deal with a potential misunderstanding before closing. Am I saying that what the Israelites witnessed at Sinai was *just* an asteroid or comet impact—that in ignorant superstition they mistakenly ascribed Divine purpose and presence to a purely natural phenomenon?

No. I am saying no such thing.

I am saying what conservative Bible scholars have always said: God was indeed present at Sinai, in an unusual way, just as the Bible claims.

God’s presence at Sinai belongs to the category which theologians call “theophany”. A theophany is when God, who is spirit and therefore cannot be seen or otherwise apprehended by humans’ physical senses, manifests Himself to one or more humans in some way. A well-known example of a theophany is God’s manifestation of Himself to Moses from the burning bush¹³—a theophany which, incidentally, also took place on Mount Sinai, but at an earlier time.

What I am saying is that the instrument of theophany which God chose when He descended upon Mount Sinai in fire was an asteroid or comet im-

¹³Exodus 3:1–6.

pact event, and the crater which one finds atop Mount Yeroham today (Figure 3) is a modern witness to that ancient theophany. ◊

Research in Progress

Ark Search

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Figure 4: August 2001 satellite photo of IO3 (in large circle; the smaller circle encloses an object which, when taken together with the V-shaped drainage pattern immediately downslope of it, is easily identifiable on comparable Google Maps views).

When Gerald Aardsma first introduced “IO3 (Interesting Object #3)” to readers of *The Biblical Chronologist*,¹⁴ he described it as “an object of considerable interest to the present search [for Noah’s ark]”. Indeed it was. Several men devoted much time, effort, and expense to investigate its true nature.

The IO3 project climaxed in August 2001 with acquisition of modern satellite imagery.¹⁵

Further significant progress was not made until February 2008, when Aardsma found color imagery on the Internet provided free of charge by the Google Maps™ mapping service. Given this new evidence, he and I now feel that IO3 appears to be nothing more than a set of geological features and should no longer be considered an ark candidate.

¹⁴Gerald E. Aardsma, “Research in Progress,” *The Biblical Chronologist* 5.3 (May/June 1999): 7–16.

¹⁵Gerald E. Aardsma, “Research in Progress,” *The Biblical Chronologist* 7.5 (September/October 2001): 8.

Plans to publish an image from the Google Maps mapping service were frustrated because no permission to do this was received after weeks of trying to obtain it. Readers with access to the Internet can still study the image online and draw their own conclusions, but patience is needed to follow complicated instructions. Please accept my apology for this inconvenience.

Go to www.google.com and click on the Maps link near the upper left corner of the home page. If a map or terrain view appears, click the Satellite button near the upper right corner of the map. Point the hand-shaped cursor at this button without clicking to see a “Show labels” option appear. Be sure that this option is checked. Enter “Turkey” in the “Search the map” field, and then click the “Search Maps” button to show a satellite view of Turkey. Point the cursor at the southeast corner of Turkey where its border meets the border between Iraq and Iran. Double click to center the image at this triple boundary junction and zoom in.

The general region of interest is about three quarters of the way along a straight line from this triple boundary point to Hakkâri. Center this region in your screen and zoom in step by step. A set of glaciers should become visible when the scale reads “2 mi”, and quite clear when it reads “1 mi”.

One of the glaciers near the middle of the set is heart-shaped. Center the bottom tip of this glacier in your screen and zoom to the “2000 ft” scale. Double click about 3000 ft to the south of the bottom tip of the heart-shaped glacier to center this region in your screen.

Zoom in to “500 ft”. In the right half of your screen you should see a relatively smooth scree field flowing down from the jagged peaks north of it. The V-shaped drainage shown in Figure 4 is at the bottom of this scree field.¹⁶

¹⁶[Ed. – Here is an alternate set of directions, should you run into trouble. Enter “Turkey” in the Google Maps search field to take you to a map of Turkey. Click on the Satellite button and check the “show labels” box associated with the Satellite button. Next enter “Hakkâri” in the search field to zoom in to Hakkâri, down in the southeast corner of Turkey. Next enter “Yazılı” to zoom in to Yazılı. Now switch to Terrain view. You should see Cilo Dağı labeled to the north of Yazılı. (It may be necessary to zoom out for both Yazılı and Cilo Dağı to be in the field of view of your screen.) Locate where the road from Yazılı makes a sharp bend to the west, south of Cilo Dağı. The area of

In his first article about IO3, Aardsma admitted: “the possibility that IO3 is nonetheless just some natural object or feature of the landscape cannot be dismissed”. However, on the same page he went on to conclude, “The suggestion that the similarity of IO3 to the ark results merely from a coincidental conjunction of snow, rocks, and shadows appears improbable”.¹⁷

In hindsight, this early assessment can be considered optimistic, but Aardsma never claimed that remains of Noah’s ark had actually been discovered. In my own judgment, he never raised hopes beyond reasonable warrant given the available evidence. One might be sorely tempted to exploit or sensationalize the discovery of a candidate site as promising as IO3 still was six years ago, but his consistently sober treatment of the evidence and determination to find and share the truth about it stand as a clear testimony to his character and intellectual honesty.

The latest development can elicit mixed emotions—not only disappointment that the search has not yet been successful, but also gratitude that so little additional effort was required to discover the nature of IO3, plus joyful anticipation of accelerated progress in the search for remains of Noah’s ark. Many more people can now participate at their leisure and free of charge, thanks to Google Maps mapping service.

Elimination of IO3 as an ark candidate does not alter the choice of Mt. Cilo as the general area of most interest. The original rationale for this choice remains as valid as ever.¹⁸

Wherever Noah’s ark actually came to rest, its remains may not be discovered any time soon if God intended to hide or protect them under ice,

interest is in the scree coming down from Cilo Dağı, about half way between the summit of Cilo Dağı and the middle of this bend in the road. Keeping this area centered on your screen, zoom in step by step to full zoom. The scale at bottom left in the view should show “1000 ft”. Switch to Satellite view. The dark object circled in the bottom right corner of Figure 4 should then be identifiable together with the V-shaped drainage pattern immediately downslope of it. The V points a little west of south in the Google Maps view. Zoom in, matching features with those shown in Figure 4 to find your way to the location of IO3.]

¹⁷Gerald E. Aardsma, “Research in Progress,” *The Biblical Chronologist* 5.3 (May/June 1999): 14.

¹⁸Gerald E. Aardsma, “The Ark on Ararat?” *The Biblical Chronologist* 3.2 (March/April 1997): 1–12.

snow, scree, or some other cover. He may choose to reveal the secret location of the ark, but it could be quite dilapidated or in pieces too small to be seen even in photos with much higher resolution than presently available. Mountain summits are the favorite destination of mountain climbers, so if the ark were balanced right on a summit in our time like a giant barge on a hilltop, then its location would not be a secret.

The Mt. Cilo area should still be considered a war zone and politically sensitive, so prospective visitors are urged to respect the civil and military authorities charged with policing the region and to assume that many live land mines pepper it. Therefore, if a new “interesting object” is found that may seem to call for a ground expedition, caution is highly recommended, as well as patience to wait for God’s timing and blessing on any common-sense effort to investigate it. ◊

The Biblical Chronologist is written and edited by Gerald E. Aardsma, a Ph.D. scientist (nuclear physics) with special background in radioisotopic dating methods such as radiocarbon. *The Biblical Chronologist* has a three-fold purpose:

1. to encourage, enrich, and strengthen the faith of conservative Christians through instruction in Biblical chronology,
2. to foster informed, up-to-date, scholarly research in this vital field within the conservative Christian community, and
3. to communicate current developments and discoveries in Biblical chronology in an easily understood manner.

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