

Atheism, Evolutionism, and Green River "Varves"

by Paul G. Humber*

The present author and Frank Zindler, Editor of the *American Atheist*, have carried on a correspondence that has lasted over four months¹. Many issues have been discussed, but by agreement there was a focus on two. One² was geological and may be put in the form of a question. Do the "varves" of the Green River Formation (near the Rocky Mountains) disprove the chronology of the Bible? Mr. Zindler is of the opinion that they do. I strongly disagree. He wrote, "But the whole question of astronomical time is rendered unimportant by the fact that we have evidence right here on earth that rules out absolutely the biblical chronology and shows that the earth...has existed through long periods of time. I refer to the Green River Shale of Eocene age out in the Rocky Mountain area...."³



He also drafted the following: "In the case of the Green River Shale, the number of annual layers (not true varves, however, in their formation) extends to about three million.... I have repeatedly challenged such apologists to explain how, if these delicate layers (about 80 pairs of black/white layers per cm) are NOT annual layers, such delicate layered deposits (in the case of the Green River shale extending over thousands of square miles) could have been formed during a world-destroying flood, the ferocity of which biblical apologists never fail to require at various other parts of their 'theory.'"³

How should a Christian respond to this challenge?

The Apostle Peter wrote, "But in your hearts set apart Christ as Lord. Always be prepared to give an answer to everyone who asks you to give the reason for the hope that you have. But do this with gentleness and respect" (1 Pet.3:15). This does not mean that Christians have to become experts in everything, but loving the Lord with our minds may include doing more study than we had planned. The Lord Himself set an example of answering antagonistic questions.⁴

Atheism worships the idol-god, Evolution.

Everyone has a faith in something. If it is not in God, then it is in self or something else. Frank Zindler's faith is in evolution. He wrote that "we must never lose sight of the fact that all of science nowadays interlocks to produce a picture of evolution, from the cosmic level to the social level."⁵ In the same context, he wrote, "The geneticist Dobzhansky once said that nothing in biology makes sense apart from evolution. The truth of that statement is everywhere evident."⁵ My response at the time was as follows: "If I'm not mistaken, the Founder of Genetics opposed Darwin's theory. Several years ago, my wife had hairy cell leukemia. Her hematologist let me see

the hairy cells in his microscope. I asked him if there was ever a time in human development when the blood is something other than human. (Sagan had suggested in an article I read that humans go through evolutionary stages during development--justifying abortion⁶). He contacted an authority at the University of Pennsylvania. The answer was that the notion is silly. Human blood is always human. It seems to me that evolutionary thinking might actually retard increased understanding about human blood. Here is biology that makes sense without evolution."⁷ My correspondent did not see his attitude about the Green River "varves" as a faith, however. He wrote, "It certainly is not 'faith' that accepts the reality of the millions of laminae in the GRS--laminae which by any imaginable means of formation requires more time than is allowed by the biblical chronology. This is science, not religion. This is acceptance of evidence, not belief based on faith (which Webster defines as 'unquestioning belief that does not require proof or evidence')⁸."

Does the Green River Shale Formation point to Long Ages?

My early responses were somewhat tentative. I didn't know much about this formation and wrote, "In Wyoming, the Mowry Shale contains an abundance of fish scales. How do we account for the tremendous number of fish scales unless we consider much water? Fish scales generally do not fossilize. Again, flooding is suggested. The Green River fish fossil shown to me by my colleague also points to significant water deposition."⁹

I added a conjecture about the so-called varves: "Many years ago, following massive flooding and major ice-sheeting in northern (and southern) regions, the earth, seeking as it were to attain thermo-equilibrium, started to melt the ice. Edges of the Ice Sheets receded slowly north (and south). What we know today as the Green River Formation was involved in this process. With the melting came trauma to land. Canyons were formed rapidly (when massive amounts of water broke through natural, ice dams--cf *Smithsonian* article¹⁰)."

My associate in writing objected: "Now the idea that the GRS is post-glacial is utterly impossible. Even without recourse to radiometric dating..., the simple laws of sedimentary superposition show that the GRS was deposited long before the Pleistocene Epoch. Also, the nature of glacial outwash deposits is well studied (I myself have studied them in the field) and no competent geologist could possibly confuse them with varves. Also, you couldn't form layers of fish-scales or insect wings from glacial outwash--or with Noah's Flood either, for that matter."¹¹ Surfing the Internet, I learned of Dr. Paul Buchheim, a professor of geology. He was kind enough to send some papers he had written concerning his own studies in the field. One abstract offers the following:

LAMINAE COUNTS WITHIN A SYNCHRONOUS OIL SHALE UNIT:
A CHALLENGE TO THE "VARVE" CONCEPT BUCHHEIM, H. Paul,
and BIAGGI, Robert, Department of Geological Sciences, Loma Linda
University, Riverside, Ca. 92515

Many workers have interpreted the thin laminae common to "oil shales" of the Eocene Green River Formation as "varves". However, laminae number and thickness studies of one unit in the formation near Kemmerer,



Wyoming provide evidence to the contrary. One particular unit, dubbed the "Lower Sandwich Horizon" or "LSWH" was discovered to vary in thickness from 8.3 to 22.6 cm between localities spaced up to 15 kilometers apart. The laminae number of this unit varies from 1160 to 1568, with an overall increase of laminae number (up to 35%) and laminae thickness from basin center to margin. Kerogen content decreases from basin center to margin. Kerogen poor samples are more thickly laminated (.11- .19 mm) whereas kerogen rich samples are thinly laminated (.07). The LSWH is bounded top and bottom by two easily mappable tuffs about 2-3 cm thick. The tuffs represent time-synchronous units and theoretically the same exact amount of time is represented between them at all locations, no matter how many laminae there is between them or how thick the unit be.

The differences in laminae count, laminae thickness, unit thickness, and kerogen content can be accounted for by a model evoking more voluminous sedimentation and more frequent sedimentation "events" nearer the lake margins than center. The "varve" model is not adequate to explain these differences because it would predict the same number of laminae lake-wide as well as consistent unit thicknesses and kerogen content.¹²

I contacted other authorities as well. What follows is a summary response on my part to Frank Zindler (see image →) about the Green River "Varves":



1) This issue is important. You have faith that it disproves biblical chronology. It is my purpose here to help you see why it does not. I realize you view this as an impossible assignment.

2) You also don't like the term, faith, as used above, but when you get into an airplane, you have faith (not certainty) that it will take you to your destination. This is the kind of thing I mean. The plane may crash, and I believe your confidence (faith) that your understanding of varves is accurate will crash sooner or later.

3) I have done several things to look into the varve matter more thoroughly. I share below some of my findings, but there are still some pending matters which may subsequently come in. Michael J. Oard, for example, has written on the subject, but I haven't yet checked into this. It's apparently in the Sept. '92 issue of the *Creation Research Society Quarterly* (pp.120-126). I may have it, but I'm not sure where it is.

4) One of the things that had been pending was my email letter to Dr. John Baumgardner. I was hoping I would get a response from him, and I did. About two years ago, you may have seen the article that was in *U.S. News and World Report* (6/16/97, p.55ff) about this scientist entitled, "The geophysics of God." It says Dr. Baumgardner is "the world's pre-eminent expert in the design of computer models for geophysical convection, the process by which the Earth creates volcanoes, earthquakes, and the movement of the continental plates." He got his master's in EE from Princeton and a Ph.D in geophysics from UCLA. I asked him if he had any insights about the GRF "varves." On Fri., Jul 16, he responded:

One needs to consider the geological record as a whole and ask what does it tell us, and similarly with the Bible. I claim the geological record is literally screaming out: global water catastrophe! And the Bible likewise indicates the primary geological event since the creation of life on the planet is a global Flood. One then needs to approach the Green River Formation with this context in view. In terms of the Genesis Flood, the Eocene in my assessment falls within the

time of regression of the Flood waters from the continents. The varve-like laminae would then have to be produced by rapid sedimentation with rapid oscillations/wavelike conditions modulating the sedimentation process. A period of several seconds is sufficiently short to generate the number of laminae in the time available. One thing I can guarantee is that the evolutionary sedimentation rate of 10 microns per year will bury and fossilize not a single one of the billions to trillions of beautifully preserved fish to be found today in the Green River sediments. I hope these brief remarks are helpful.

I (PH) continue: Dr. Baumgardner's view is less complicated than mine. He sees the laminae as forming over much shorter periods than my model. Instead of 6 or 7 laminae per year (my model), he sees them forming as a result of water regression, modulating wave motion over relatively flat surfaces, in mere seconds, etc.. I like it. I realize you probably radically disagree



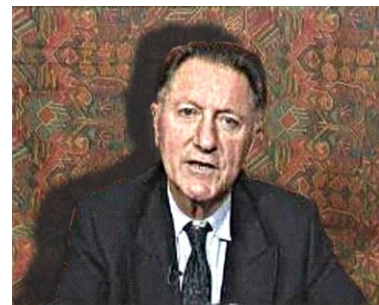
with his view. You probably want him to account for what you view as the dual-aspect of the laminae, but there are two responses I have to this. First, the smaller picture must fit into the larger (not the other way around). Second, the impression I have from the reading is that the laminae of the GRF are not classical varves; the dual aspect is not as clearly defined, etc..

5) On Monday, 7/19, I received another response from a practicing geologist, Carl Froede. He does

not completely agree with Dr. Baumgardner's approach; he does agree, however, "that the 'varves' were catastrophically formed." His approach is "post-Flood land-locked lakes which were fed by the wet weather conditions of a post-Flood Ice Age (I wrote about a similar setting for Lake Manly in Death Valley a while back)." He added, "Volcanism which occurred during this time added 'layers' to these slowly subsiding saline lakes. Over time and with more water the lakes turned 'fresh.' The varves are a function of clay flocculation, dynamic compaction, and pH and Eh changes which occurred as the lakes turned from saline to fresh. The high acidity or alkalinity of the volcanic ash layers (they do vary even today) also played into producing these 'varves.' This is my 'guess' at this time."

An additional comment may be instructive. When I emailed Carl, I did not reveal your name. So his following comments are general in nature. He wrote, "You will NEVER convince anyone of our Biblical position (i.e., young-earth, global Flood, the need for a Savior, etc.) unless they receive Jesus as their Lord first. I have shut my non-believing uniformitarian 'friends' up and had them admit that I was just as 'right' as they were--but they have NEVER agreed with me about the Flood or the Biblical approach. They are blind (willfully!)." (Added comment from PH: Please consider that man's problem is not as much an intellectual one as an ethical one. Man, in his pride, is in rebellion against God. Repentance and faith in Jesus is the only hope. Darwin did not conquer death. You and I face death. Jesus' tomb is empty. I pray to Him daily. He has flooded my life with overflowing delights. Sure, there are struggles, but He answers prayer. If you want more about answered prayer, let me know.)

6) Have you heard of Guy Berthault (see image →), a French sedimentologist? He reported that the Bijou-Creek Flood in



Colorado ('65) produced twelve feet of sediment in 48 hours and that 90-95% of the sediment had "horizontal laminated strata." A hundred years from now, a person looking at the horizontal laminated strata from the BCF might conclude old age, but the reality was 48 hours! This, to my way of thinking, gives some independent support to Dr. Baumgardner's words (above).¹³

7) I've looked at some videos. One of them, *Evidences--the Record of the Flood*, is very good. It produces scientific evidence for the flood, and a lot of the evidence is in the region surrounding the GRF and south to the Grand Canyon. If you haven't seen it, I highly recommend it.

Apparently there is much evidence of turbidity formations and salt-water shells--suggestive that ocean water once covered much of the West. Have you heard about these items? Let me know if you'd like to see one or two of these videos.

8) Omitted.

9) Back to the GRS formation--we are talking about something that is 27,500 feet thick--n'est-ce pas? If so, then we are talking about layering that is twice the height of the Grand Tetons! I've also seen Mt. McKinley. It's huge, but it's still less than 27,500 feet. You use the vast size of the GRF to prove (in your mind) an earth millions of years old, but this is very unusual layering. It does not exist all around the globe. It is massive. One mechanism that could account for such massive deposition is massive flooding on a massive scale. You say the flood does not fit the detailing of the layers, but this "detailing" may be mostly post-flood. A tremendous amount of the massive layering, however, came about as a result of the flood. Some of the layers may even be pre-flood. Then the flood came with turbidities, etc.. After the flood came the influences of glaciation, water melt, glacial dams, breaking of the same, etc.. The detailed laminae are not real varves (even you concede this). My thinking (and I wrote most of this before receiving the email from Dr. Baumgardner) goes something like this:

Further to the north (Canada), there were ice sheets (remnant glaciers following flood trauma). During warmer days, the ice would melt and fill streams which ran for some distance over land and eventually into large, but shallow, lake-basins. During cooler periods, the stream water diminished significantly because the ice-sheet-melting diminished. This would result in thin layering. Correspondingly, during hot spells, there would be significant ice melting. The ice flow would increase the size of smaller streams and "push" fish and other organisms into the filling lake basin. The fish, etc. would live for awhile but die when the cycle changed--there being a lag between the initial melting of ice and the arrival of stream water to the lake basins. As the water in the basins became too shallow; organisms would die. They became fossilized in the shallow (muddy) water. With the return of a hot spell, the cycle would start again--melt, full streams, a push to the lake, lake life, drying shallow-lake-death, lamination, recycling, etc.. During the summer, there could be multiple laminations. Some of them could be true varves. Over a long period, significant layering would build up. (As I said, most of this was written before the arrival of Dr. B's email. Maybe it could be seen as an alternate to his. I will grant that my approach is probably vastly inferior to his.)

10) I've been around long enough to know that even the pro's can miss important details. We are dealing with something that is somewhat of a mystery--none of us were around when much of this happened. Let's say there are a thousand pieces to this "picture" puzzle, and we may have only 50 or 60 pieces in hand. Ph.D geologists may have 90 or 100, but they still have only about 10% of the data. In other words, they can have pieces in the wrong places, etc.. For you to suggest that I abandon my confidence in the historical accuracy of the Bible because I cannot explain everything about the GRS formation (or submit to some subjective and potentially faulty

geological interpretation about the GRS) is, to my way of thinking, silly. (I am not insulting your intelligence here; I believe you are quite intelligent. But sometimes even intelligent people can make silly decisions. It seems that JFK Jr, an intelligent graduate of Brown, made a silly decision recently. The final chapter on the GRF has not been written.)

11) You wrote, "The GRS laminae alternate in thickness patterns that follow the 11-yr sunspot cycle and higher cycles such as that of the precession of the equinoxes." I am very skeptical about this and am confident that real geology has not gotten to this level of refinement. You may have faith that it has; I don't.

12) FZ: "Organic materials in the layers include algal spores, fish scales, arthropod droppings and body parts, pollen and spores of higher plants, etc. Some layers are interrupted by the remains of fish and other vertebrates. Some layers are broken by mud-cracks and crystals of salt." I don't see this as posing a major problem for either approach discussed above.

13) FZ: "...you have not answered my eye-witness testimony proving the existence of at least three glacial periods which commenced at the end of Noah's Flood." PH: We're trying to stay on task. The number of Ice Ages is another topic. Briefly, I do not have too much difficulty with Ice Ages (plural) if they follow closely one upon the other. It does not take an Ice Age to bury trees, however. An erupting Mt. St. Helens is quite adequate.

14) FZ: "You will not commit yourself to a date for Noah's Flood or say whether Ussher's date of 2348 BCE is correct or not." PH: Again, this is somewhat off task. Briefly, Ussher's date may be too late. Abraham lived around 2,000 B.C.. The flood may have taken place around 4,000 B.C.. I do not have a definite date, but the date I've supplied seems reasonable to me. 3,500 might be better; I don't know. I don't believe the Bible requires a specific year. Matthew 1:1 says that Jesus was "the son of David, the son of Abraham." Here we have the span of 2,000 years and only three persons are mentioned. Matthew did not intend for anyone to believe that Jesus was an immediate descendant of David or that David was an immediate descendant of Abraham. There's room for expansion.

15) FZ: "I hope you are beginning to see that you have a serious problem here." PH: I'm not. In fact, I'm becoming even more convinced that your varve argument is weakening. I only add in passing, because this is off topic, that you also have a very serious problem getting life from non-life without Life Himself (John 14:6) creating it.

16) FZ: "Regardless of whether or not the GRS laminae are annual deposits or not, you have to come up with A PRECISE MECHANISM FOR THEIR FORMATION.... You must explain how three million of them could form so quickly." PH: See above.

17) Finally, I end with some questions for you. Exactly how many GRF "varves" are there? If the earth is 4.5 billion years old (your view), why are there so many missing "varves"? 8-9 million "varves" is a far cry from 4.5 billion! And why was the climate so consistent in this limited area for 8-9 million years while the rest of the earth experienced drastic changes in the environment? Finally, how do you account for the massive fish burial "events" that even uniformitarians agree are unusual? [One of my creationary friends wrote on this point, "...two facts about the Green River Formation in Wyoming that challenge the notion that varves represent a year's worth of lake sediments. (1) Fossil catfish are found in excellent states of preservation over an area of 16,000 sq. kilometers of this formation. Given that dead fish placed on a muddy marsh floor and protected from scavengers by wire cages decay significantly in less than a week, such remarkable preservation hints at very rapid burial rather than slow, annual accumulation. (2) Two layers of volcanic ash within the formation, each presumably from a single event that

deposited ash over a wide area, are separated by differing numbers of varves (from 1,160 to 1,568). This suggests that varve counting is not an accurate method of determining age."]¹⁴

Conclusion:

This is not meant to be a definitive explanation of the Green River "varves;" rather, it is an attempt to show that Christians do not have to be afraid of interpretations that supposedly disprove the Bible. Frank Zindler has faith in his interpretation and has chosen to disbelieve the Bible. I do not have faith in his interpretation; in fact, I believe his interpretation is wrong. I will say, however, that my correspondence with Mr. Zindler was quite civil. There were occasional tensions; more of this is revealed in the other paper².

* Paul G. Humber taught for 24 years as a member of the Upper School faculty of the Haverford School (1977-2001). He currently (2016) is Director of CR Ministries.

Endnotes:

1. It began in March of 1999.
2. The other issue related to the question of the Lord Jesus Christ's existence. A paper was written by this author on this aspect, too. It is entitled, *Atheism vs. Biblical Prophecy*.
3. Date of correspondence, 3/29/99.
4. See John 8:13, 19, 25, 33, 48, 53, 57; 9:40; 10:24, 33, etc..
5. Date of correspondence, 3/30/99.
6. Carl Sagan and Ann Druyan, "Is It Possible to be Pro-Life and Pro-Choice?" *Parade Magazine*, April 22, 1990.
7. Date of correspondence, 3/31/99.
8. Date of correspondence, 7/5/99.
9. Date of correspondence, 5/21/99.
10. Michael Parfit's article, "Before Noah, there were the Lake Missoula Floods" (*Smithsonian*, April 1995), shows prejudice even in the title. Nevertheless, the article admits to grand evidence for massive flooding in the American Northwest.
11. Date of correspondence, 5/26/99.
12. See the *Program* of the Centennial Celebration of the Geological Society of America, 1988, A317.
13. Guy Berthault, "Experiments on Stratification," *The Proceedings of the Third International Conference on Creationism* (Pittsburgh: Creation Science Fellowship, 1994).
14. Date of correspondence, 7/21/99.