Critical Analysis of the book "Rethinking Radioactive Dating" by Vernon Cupps

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Introduction

Vernon Cupps, a nuclear physicist, is the author of a new book "**Rethinking Radioactive Dating − Evidence for a Young Earth from a Nuclear Physicist**" (2019, published by the **Institute for Creation Research;** 138 pages). In this book he claims that secularists make assumptions when doing radiometric dating that create dates that cannot be verified. He examines what he says are significant problems with radioactive dating methodology. In addition to giving details about major radiometric dating methods (potassium-argon, rubidium-strontium, uranium-lead, and others), he also examines thermoluminescence dating, Earth's magnetic field, Po-halos (radiohalos), zircons, radiocarbon dating, and soft tissues in fossils to suggest that these data actually indicate what the real age of the Earth is and that it is 6,000 years old. He says that Christians should rely only on scriptures that indicate that the Earth, life, and everything else were supernaturally created by God in this time interval.

The following is a critical analysis of what Cupps reports in his book in the order of the chapters on different subjects. Not all chapters and their contents are discussed in this critical analysis because that would require writing another book, and I am not a physicist and qualified to discuss his models involving nuclear reactions. Therefore, only some parts have been selected that clearly need comments and are on subjects that I have some expertise and for which I have examples that I can use. Two additional topics are added (Precambrian time and oxygen in the Earth's atmosphere) that Cupps does not discuss in his book, but the explanations given about these topics are applicable to evaluating whether his belief that the Earth is 6,000 years old has any merit.

Introduction section of Cupps' book

Cupps points out that 70-88% of young people that were once members of the Baptist Church are "leaving the church after their freshman year in college." He believes that this has happened because "we have surrendered to two of the pillars of secular humanism being taught as facts in our school − evolution and deep time." On that basis, he says that these students are being led "down the dark paths of nihilism." He believes that such teachings lead to secular humanism and that "for secular humanism… …the transcendent, omnipotent, omnipresent, omniscient God, who created the universe and everything in it, is replaced by science, or more generally by naturalism." He says that "the three fundamental pillars upon which naturalism rests are deep time, evolution, and absolute uniformitarianism." He further states that such teachings of secular humanists are "simply the opinion of a few, very privileged, isolated, clueless people." He believes that the Bible is inerrant.

Before going on, some of his statements need to be addressed here because they are false. (1) Plenty of evidence exists that evolution is clearly a fact. See the following link: http://www.csun.edu/~vcgeo005/Nr58Evolution.pdf And, (2) Geologists have long ago discarded the concept of "absolute uniformitarianism." Such a concept can be applied where evidence shows that gradual geological processes have occurred. However, in many places catastrophic events have clearly happened. Uniformitarianism is now used as a guide to thinking where it is appropriate.

Cupps does not further address either of the above two issues but concentrates on "deep time" and mostly the radioisotopes used in dating methodology. He says that contemporary secular scientists make four assumptions upon which they rely, and these assumptions are:

1. The decay constants are indeed constant throughout time.

2. The rock system being dated is a closed system during the age of that system.

3. The initial concentrations of radioisotopes being used for dating a given rock system are known or can be extrapolated from other known data.

4. Enough decay has occurred to enable the amounts of radiogenically generated daughters to be differentiated and measured.

First, statement #2 is false because most magmatically formed igneous rocks, early in their generation, are in open systems, and even after solidification can be deformed and micro-fractured so that they become open systems again. These observations are illustrated with examples later in this article.

Second, most issues that are raised in Cupps' book, suggesting faulty and alleged unreliable radiometric age dating methods, largely come from studies made by the ***Institute for Creation Research*** (ICR) in their RATE project (Radioisotopes and the Age of the Earth II, 2005, 818 pages). Among these issues are (a) supposed fluctuations in the rates of radioactive decay that make dating unreliable, (b) supposed indications that decay rates are not stable, and (c) supposed alterations of decay rates by the relative positions of the sun and Earth. The conclusions reported in the ICR document regarding items (a), (b), and (c) have all been addressed in the following link: https://www.asa3.org/ASA/education/origins/rate-ri.htm as well as in a paper by Randy Isaac, "Assessing the RATE Project" that is published in the journal ***Perspectives on Science & Christian Faith***, June, 2007, pp. 143-146. In this link and paper, the ICR conclusions are shown to have no merit. For that reason, no more space is spent on these topics in this article because they are more fully developed and explained in this link.

Nevertheless, additional information is presented here that comes from research done by Brent Dalrymple (1984, 1991). He has carefully examined all radiometric age-dating methods that are discussed by Cupps. He demonstrates that the several different kinds of methods on the same igneous rocks produce the same equivalent times (within laboratory error). (1) Because the chemical and physical properties of the radioactive elements are totally different, (2) because these properties cause these elements normally to crystallize in different minerals at different temperatures, and (3) because the half-lives of the radioactive elements in these rocks are different, it is illogical that the Creator supernaturally caused these rocks to have the same ages and ages that are different from place to place in the Earth's crust. A supernatural origin of the long age-times of rocks in the Earth (greater than a few thousand years − say 6,000 years) is illogical because, if the

Creator produced all granite masses that form the cores of the world's continents on Day Three of the Genesis Week (if a literal translation of the Bible is employed and indicated in Chapter 1 of Genesis when the Earth was formed), should not they all have the same young radiometric age? Noteworthy is the fact that Cupps or other young-Earth creationists have never found any rock on Earth that gives an age date of 6,000 years no matter what age dating method is used and if the Earth is truly that old, why have not such rocks been found and dated? Moreover, surely the Creator would not produce natural laws that are not dependable such that radiometric age-dating methods cannot be trusted. If the Creator's natural laws are not dependable, how can Cupps do his research in nuclear physics?

Dalrymple (1984, 1991) also reports many errors made by young-Earth creationists regarding their criticisms of the accuracy of radiometric age dating. Moreover, if Chapter 1in Genesis and other books in the Bible are not giving real age dates for the time in which the Earth was formed, then the supposed problems with age dating methods described in Cupps' book are speculations that are "grasping at straws" to support his belief. To do proper science, Cupps cannot selectively choose data that he believes support his model and ignore data that do not.

Chapter 9. Alkali Metal Dating, Rubidium-Strontium Dating Model

Cupps says that "a little advertised characteristic of rubidium-containing minerals is that they are moderately rare in nature. When they do occur in rock samples they are usually in such small amounts that they cannot be seen without a microscope." He also says that dating of the age of a rock by the rubidium-strontium method "can only be constructed from a group of different, separated minerals in the same formation."

First, Cupps' claim that rubidium-containing minerals are moderately rare in nature is totally false. Because rubidium (Rb) is in the same column of the periodic atomic chart as potassium (K), it behaves with similar chemical properties. Therefore, it is commonly found in K-bearing minerals, such as K-feldspar, and biotite and muscovite mica. In granite, K-feldspar can occur in amounts more than 33 percent and micas are commonly 5 to 10 percent. However, it is true that radioactive ^{40}K is relatively rare and in amounts of only 0.012 % (120

parts per million). Rb can be as much as 300 ppm in the Earth's crust. Therefore higher abundances are found in K-feldspar and micas. https://en.wikipedia.org/wiki/Abundance_of_elements_in_Earth%27s_crust

Second, it is true that normally Rb-Sr dates are obtained where a rock has been subjected to a change in geologic condition, such as a new temperature or retrograde metamorphism or where the rock has been subjected to introduction of hydrothermal fluids. In these places, such Rb-Sr age determinations are done by using separated minerals from the same rocks. No assumptions are made about when an igneous mass is intruded and/or its timing as to when a new radiometric age begins to start the clock. The beauty of the Rb-Sr age dating method that makes it trustworthy is that it provides a way (unlike other dating methods) to establish when the clock was set. Therefore, when a Rb/Sr age date is younger than radiometric ages of older igneous rocks in an area, such a relationship provides a trust in the dating (Dalrymple, 1991).

Relative to such a geologic situation, I studied an area in the southern Sierra Nevada Mountains near Lake Isabella in California where the Rb-Sr age clock of a hornblende-biotite diorite was in the process of being re-set when this diorite was deformed, micro-fractured, and converted into myrmekite-bearing granitic rocks and then eventually locally into granite lacking myrmekite during final stages of all these processes. Myrmekite is a two mineral intergrowth of plagioclase feldspar and quartz that is produced in this kind of chemical replacement process. See: **Figure 1**; Collins (1988) and http://www.csun.edu/~vcgeo005/Nr49Isabella.pdf The origin of myrmekite is explained at this link: http://www.csun.edu/~vcgeo005/Nr56Metaso.pdf Such deformation, chemical replacement, and recrystallization to form myrmekite, that was also accompanied by the re-setting of the Rb-Sr clock in these Sierran rocks, cannot possibly have happened in 6,000 years, unless done supernaturally. Because natural physical laws (also produced by the Creator) make it possible for these chemical, physical, and geological processes to occur in this place, a supernatural creation in this short time interval is not really required nor are these processes described in the Bible because it was not written as a science text.

However, as described by Cupps, there may be places where Rb-Sr age dates give values that do not make sense. But such does not invalidate all Rb-Sr datings.

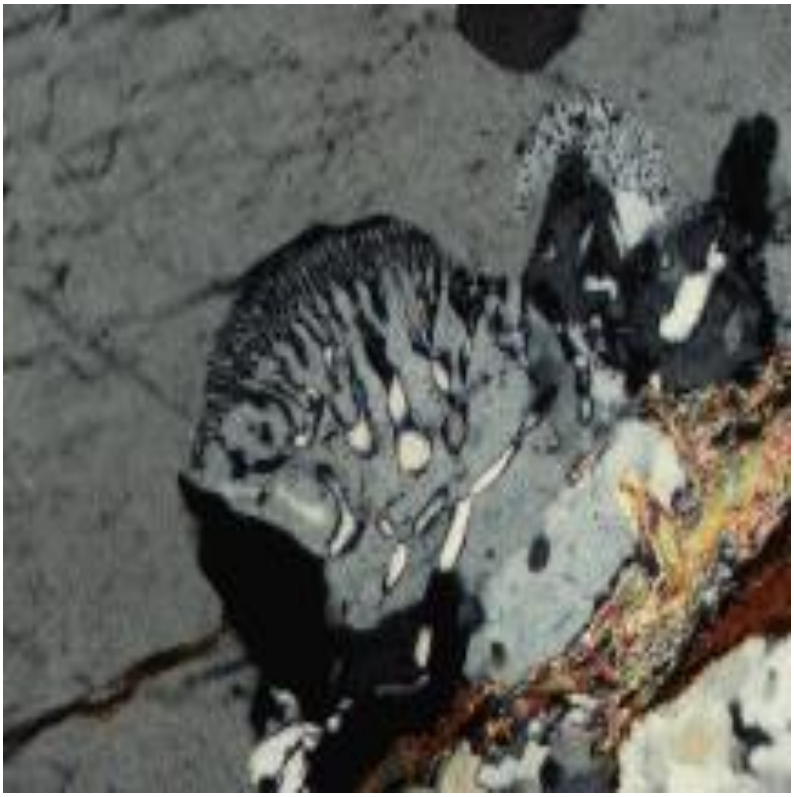

Figure 1. Myrmekite (center) consisting of plagioclase feldspar (light gray) enclosing tiny, tapering, branched crystals of quartz (white, grading to black). Biotite mica (lower right side; tan and brown). Top and left side (light gray) is potassium feldspar (K-feldspar). Image was photographed at 40x magnification, and the width across the image is 4.5 mm.

Chapter 14. Examining Thermoluminescence Dating

Cupps discusses thermoluminescence dating where it is commonly used to date the age of pottery. He points out that the amount of luminescence that is produced depends on the amount of cosmic radiation from space and the depth of burial of the object that is being analyzed. He also points out that the age that is measured depends on whether the flux of radiation is constant, which may not necessarily be true.

Nevertheless, in some places thermoluminescence-determined age dates make logical sense. For example, in a study of the time that it must have taken for the Colorado River to cut the mile deep Grand Canyon, scientific observations of the erosion rate of the hard crystalline Zoroaster Precambrian granite at the bottom

of the canyon show that Colorado River presently erodes this granite by less than one thousandths of an inch per year. http://www.csun.edu/~vcgeo005/GrandCanyon.pdf Therefore, the formation of this canyon must have taken at least 5 to 6 million years to be formed because this very long time is required to erode 100 feet (30 m) down into the granite. On the basis of this great-age, it confirms the thermoluminescence age dating studies of sediments in ancient river terraces along the walls of the canyon and makes their ages logical. These terraces exist from the canyon top where the Colorado River first cuts into the sedimentary rocks and then down to its present level into the Precambrian granite at the bottom of the canyon. Perhaps there are possible errors in the dates because of a possible variation in the flux of cosmic rays, but these errors, if they exist, could not have resulted in reducing the terrace-forming time to less than 6,000 years that Cupps believes is the age of the Earth. Nevertheless, the progressive changes in thermoluminescence ages found in sediments deposited by the Colorado River in river terraces along the walls of the canyon from top to bottom of the canyon are ***consistent*** with what would be expected, according to the rates of erosion by the Colorado River cutting through granite and the sedimentary rock layers in the canyon. Note that both rates of erosion in the granite and sedimentary rocks affirm long ages (greater than 6,000 years) and are not measured by radiometric dating methods, which Cupps criticizes in his book. Moreover, in addition to the long thermoluminescence ages that were determined, two other methods of age determinations were used (cosmogenic radionuclide dating and fission-track counting in apatite crystals), and these methods also give ages that are many thousands of years more than 6,000 years. See: http://www.csun.edu/~vcgeo005/GrandCanyon.pdf Therefore, the Creator does not necessarily do all his creation by supernatural processes as Cupps claims.

Chapter 15. Earth's Magnetic Field

Cupps points out that the Earth's magnetic field has been decaying at a steady rate. He says that "if the Earth were billions of years old, then its magnetic field should have decayed away long ago" and for this reason he says that this decreasing is a strong advocate for recent creation. It is admitted that how this field is created is not fully understood and that this rate of decay is true for the present time. However, Cupps ignores the fact that the geologic record indicates that many such decreases of the magnetic field have occurred during ancient

history and that these many events eventually caused the orientation of the magnetic north and south to be reversed many times. See: https://www.google.com/search?rlz=1C1EJFA_enUS695US695&ei=IZ8BXe-4IsGx0PEPu8eZkAI&q=magnetic+field+reversals&oq=magnetic+field+reversals&gs_l=psy-ab.12..0l2j0i22i30l8.10751.10751..14077...0.0..0.83.83.1.....0....1..gws-wiz.....0i71.DRS1wmaFCAU

Cupps must use all available data to support his negative arguments and not just choose data that fit his model, if proper science is done.

Chapter 16. Radiohalos: Nature's Tiny Mystery.

Cupps says that "a radiohalo does not begin to form until around 500 million decays have occurred" and suggests that "at today's decay rate, it would take nearly 1 billion years to form visible radiohalos." On that basis, he says that there is not enough time in the secular model to produce the radiohalos that occur in biotite in rocks of Tertiary and late Paleozoic-Mesozoic eras to 500 million decays and that this observation shows that the "decay rates must have been substantially greater in the past, and dating rocks with radiohalo method is unreliable." He says that the abundance of radiohalos in these rocks is better explained in the biblical narrative in Genesis 7 as stages in which the sedimentary rocks of the great Flood were deposited. That is:

"At the beginning and during the Flood, accelerated volcanic activity would have brought large amounts of igneous rock, with accompanying hydrothermal fluids, up through the earth's crust. Early in the Flood, rock temperatures would have dropped below the annealing temperatures of biotite, allowing the accumulations of ^{218}Po, ^{214}Po, and ^{210}Po into radiocenters via hydrothermal transport. The receding of the Flood and the shutting off of the fountains of the deep on day 150, during which no more significant hydrothermal transport of ^{238}U and ^{232}Th daughters occurred, would explain the lack of radiohalos in the so-called Tertiary layers. Since the Flood occurred over a period of about a year, this clearly implies that the decay rates of ^{238}U and ^{232}Th were accelerated by many orders of magnitude during the event, a conclusion drawn by the authors of ICR's Rate project in 2005. Clearly, the observed radiohalos and their frequency of

occurrence in the earth's rock layers support a scenario based on the biblical model far better than they support the secularists' deep time evolutionary model."

First, where radiohalos exist around tiny zircon inclusions in biotite, sufficient ^{238}U, ^{235}U, and ^{232}Th can exist in rocks of late Paleozoic-Mesozoic eras because such 500 million decays can be produced around the zircons if enough of these radioactive elements are present in the zircons. Therefore, the decay rate is not the limiting factor. Some radiohalos in biotite are extremely dark in some rocks but less dark in other places, suggesting that the amounts of uranium in these rocks differ from place to place and such can be shown by chemical trace element analyses. Nevertheless, the absence of radiohalos in Tertiary rocks can be explained by the lack of enough time to produce 500 million decays.

Second, no secular geochronologist dates the age of a rock by using a radiohalo method.

Third, in that part of this chapter where Cupps discusses polonium halos (Po-halos) he totally ignores studies that I have published on how Po-halos form by natural processes rather than miraculously on Day Three of the Genesis Week. See: http://www.csun.edu/~vcgeo005/Collins&Collins.pdf and also an article by Thomas A. Baillicul http://www.csun.edu/~vcgeo005/baillieul.pdf

There are two ways in which Po halos are formed in biotite. The first way is by the concentration of uranium atoms in hydrous fluids that are left over in final stages during the cooling of granite magma and where radioactive ^{238}U atoms in these fluids decay and release abundant Po ions that crystallize in point sites in large biotite crystals to form the Po-halos in biotite in pegmatites. As much as several thousand Po-halos per cubic centimeter are found in such biotite in uranium-bearing pegmatites. The cooling rates of granite magma at great depth (~5 km) cannot happen in 6,000 years to produce such late-stage pegmatites and the Po halos in biotite in them unless natural physical laws for the rate of heat flow in rocks are broken and these pegmatites are formed supernaturally in 6,000 years or on Day Three of the Genesis Week.

The second way Po halos are produced occurs when a former igneous mass, rich in ferromagnesium silicate minerals and relatively calcic plagioclase feldspar, is deformed and micro-fractured so that hot hydrous fluids can move through these

fractures and change the mineral compositions in the igneous mass into granite by chemical replacement processes that subtract Fe, Mg, and Ca and add K and Si so that the rock is enriched in recrystallized K-feldspar, sodic plagioclase, and quartz. Po-halos are formed in coexisting recrystallized biotite crystals because radioactive ^{238}U, ^{222}Rn, and the three radioactive polonium isotopes (^{218}Po, ^{214}Po, and ^{210}Po) are released from the former minerals and transported by these same fluids during the deformation history. Noteworthy is the fact that myrmekite (**Figure 1**) is commonly formed on the borders of K-feldspar that coexists with Po-halo bearing biotite and that all these chemical replacements and recrystallization processes require millions of years of time to occur and, therefore, cannot happen in 6,000 years. See: http://www.csun.edu/~vcgeo005/Nr56Metaso.pdf

Fourth, with respect to saying that the biblical narrative is a better explanation for the origin of the Po halos, Cupps has not considered the following two facts.

(1) The rock temperatures that supposedly dropped to anneal biotite so that radioactive Po ions could precipitate in radiocenters are alleged by Cupps to occur early in the Flood, presumably because of the cooling effect of the supposed large volumes of the cold Flood waters. But biotite in which the Po halos form is inside large masses of granitic rock that exist far below the level of the sedimentary rock and the Flood waters. How can such rocks cool to anneal biotite in this granite in less than one year during the Flood when the known rates of heat flow in rocks are exceedingly slow? Is Cupps going to do this supernaturally by miracle?

(2) The supposed acceleration of the decay rates proposed by Cupps and others in the RATE study would create just the opposite of what is said to occur in item (1) − a temperature change from cooling to extreme high temperatures because of the rapid radioactive decay that surely would melt the rocks that contain the biotite. Thus, Cupps makes contradictory statements, and his model is nonsense.

Fifth, Noah's Flood likely existed, as reported in Genesis 7, but was local in southeastern Mesopotamia. See:

Yes, Noah's Flood May Have Happened But Not Over the Whole Earth

http://www.csun.edu/~vcgeo005/Collins3.pdf More Geologic Reasons Why Noah's Flood Never Happened. (in the sense of a global flood)

Twenty-one reasons Noah's worldwide flood never happened

Response to Ken Ham and YouTube comments by Andrew Snelling.

Biological Reasons Young-Earth Creationists' Worldwide Flood Never Happened.

Chapter 17. Zircon: Earth's Oldest Crystal

Cupps reports that secular geologists believe that zircon is one of Earth's oldest crystals and suggests that "the helium leak rate from zircons challenges any old-age assignment − helium would disappear rather quickly. Yet zircons are still leaking helium. Zircons do not prove an old earth unless researchers selectively ignore the evidence that they are young."

Cupps' discussion of the diffusion of helium out of zircons has been refuted in an article by Kevin Henke (2010) in which he describes the arguments of D. R Humphrey that were alleged in the RATE project organized by Answers in Genesis. I quote from Henke's article. See:
http://www.csun.edu/~vcgeo005/henke.pdf

"Unfortunately for him, Humphreys's critics have shown overwhelming evidence that his study is flawed and useless, and perhaps even contrived to unfairly promote his creation model (Loechelt 2008c, 2009a). The vast majority of the errors in Humphreys's work are not the "mountain of minutiae" (as claimed by Humphreys 2005a), but serious mistakes that undermine any confidence in his work and claims. In particular, Loechelt (2008c) corrects many of the equations and parameters in Humphreys's documents. He further demonstrates that Humphreys's data actually support an age of about 1.5 billion years for the Fenton Hill zircons, which refutes Humphreys's claims for a "young" (6000–year-old) earth and his need for "accelerated"radioactive decay. Using his own equations and data, Humphreys's creation model actually provides a "creation date" of 90 000 ± 500 000 years instead of 6000 ± 2000 years."

Note that the 90,000 +\- 500,000 is correct. Humphrey's dates from his equations are so badly scattered that the standard deviation is actually larger than the average. (Communication from Kevin Henke, 6/18/2019)

Many cited references in the Henke article can be found in the above link.

Chapter 18. Radiocarbon Dating Can't Prove an Old Earth

Cupps clearly shows that the half-life of the decay of ^{14}C causes the disappearance of radioactive carbon in 57,000 years and, therefore, the Earth cannot be older than 57,000 years. However, he also claims that the Earth is 6,000 years old and ages of carbon-bearing organic material have been clearly demonstrated to be much older than 6,000 years. In this chapter on radiocarbon dating, Cupps totally ignores the careful studies that illustrate the verifiable accuracy of carbon-14 dating. See article by Gregg Davidson and Ken Wolgemuth at the following link. http://www.csun.edu/~vcgeo005/Nr53Carbon.pdf

Cupps claims that dates produced by radiometric dating cannot be verified, but an argon-argon (Ar-Ar) dating of a volcanic ash bed of a known age of a volcanic eruption produces the same age as carbon-14 dating of adjacent leaf fragments in layered sedimentary varves in Lake Suigetsu in Japan. Therefore, Cupps has made a false statement because ^{14}C dating can be verified.

Moreover, I have an article on Pleistocene glaciation in which wood fragments buried (a) in glacial till in a terminal moraine at the furthest advance of the last Wisconsin glacial episode give a ^{14}C age of about 20,000 years and (b) in till in a recessional moraine that give a ^{14}C age of 11,850 years. Both ages are logical in their length and timing for continental glaciers to advance and retreat and both are older than 6,000 years. Furthermore, Cupps ignores the fact that there are at least 3 older glacial episodes. http://www.csun.edu/~vcgeo005/Pleistocene%20glaciers.pdf Moreover, there are probably 20 glacial cycles in the Pleistocene. http://www.dandebat.dk/eng-klima5.htm Cupps has not demonstrated in scientific studies of ice that continental ice can flow on nearly horizontal surfaces at accelerated rates that can transport glacial till several hundred miles from Canada into the U.S. during 20 different cycles even in less than 700 years that Oard (1990, 2004, 2005) suggests

is the length of time of the Ice Age following the supposed Noah's worldwide Flood.

In addition, the following information must be considered. Accumulating snow to form continental glaciers thick enough (~18,000 feet or more) to flow from Canada into the U.S. four times (or as many as 20 times) and melt back to zero thickness between and following each glacial event cannot logically happen in less than 700 years after Noah's supposed worldwide Flood. Nor can such a short time be sufficiently long to create thick soils from fresh, unaltered, eroded rocks transported and deposited in the glacial till and to bury these soils in wind-blown loess unless (a) unrealistic snow fall rates existed to form these great thicknesses of ice and (b) blow-torch climates were present between glacial episodes to melt the great thicknesses of ice. Such is not logical and not scientific. It is strange that the biblical writers did not report these blow torch climates.

Even more damaging to the Cupps thesis is that in addition to the twenty cycles of Pleistocene continental glacial ice events, a very large continental ice mass once existed at the South Pole during Ordovician time, and this mass flowed into North Africa to produce parallel striations and grooves on sandstone beds there in the area that is now the Sahara Desert (**Figure 2)**. Oard (1990, 1997, 2009) tries to explain away the Ordovician glacial deposits as Flood deposits in a giant submarine landslide, but he fails. https://sites.google.com/site/respondingtocreationism/home/documents/ordovician-glaciations A submarine landslide would not create parallel striations and grooves.

At any rate, how can that amount of snowfall occur at the South Pole to produce that much ice and then melt away in the short time of less than a few days, if the Ordovician rocks were supposedly deposited during the supposed Noah's worldwide flood just 4,350 years ago? Radiometric ages, however, show that the Ordovician Period spans 41.2 million years from the end of the Cambrian Period 485.4 million years ago to the start of the Silurian Period 443.8 million years ago. See: https://en.wikipedia.org/wiki/Ordovician If Cupps believes that the extensive glaciation extending from the South Pole happened during the Ordovician in just a few days' time during Noah's flood, he has greater belief than most intelligent people. But 41.2 million years would be more than enough time

for this to happen. Which time would you trust − the few days in the Cupps model or the 41.2 million years measured by radiometric dating?

Figure 2. Glacial grooves and striations on Ordovician sandstone in the Sahara Desert in Africa. Image given to me by John S. Shelton, geologist and pilot, now deceased.

Chapter 19. Soft Tissue Time Paradox

It is true, as Cupps reports, that ancient fossilized bones containing the remains of organic tissue have been found in many places, (e.g., Armitage and Anderson, 2013). It is also true that modern studies of protein compounds show that they should decay and disappear in a few thousands of years. However, new studies by Jasmina Wieman show that these protein compounds convert in oxidative environments (such as sandstones, dune sands, and shallow marine limestones) to polymers that are water and decay resistant and can last for millions of years. The new compounds are known as AGEs and ALEs (advanced glycoxidation and lipoxidation end products). See:

https://natureecoevocommunity.nature.com/users/174965-jasmina-wiemann/posts/40879-soft-tissues-survive-in-mesozoic-vertebrate-remains-through-chemical-transformation Also, Schweitzer and others (2014) show that iron and oxygen act to preserve tissues in ancient rocks. https://www.researchgate.net/publication/258958602_A_role_for_iron_and_oxygen_chemistry_in_preserving_soft_tissues_cells_and_molecules_from_deep_time

Research on this topic is still on-going. When radiometric dating and geologic studies support the ancient ages of the rocks in which these fossils are found, it is reasonable to understand that the tissue-bearing fossils are actually very old.

Precambrian time

In the Cupps model, all Precambrian time, which represents almost 90 percent of Earth's history, must have occurred supernaturally during Day Three of the Genesis Week. See geologic time scale (**Figure 3**).

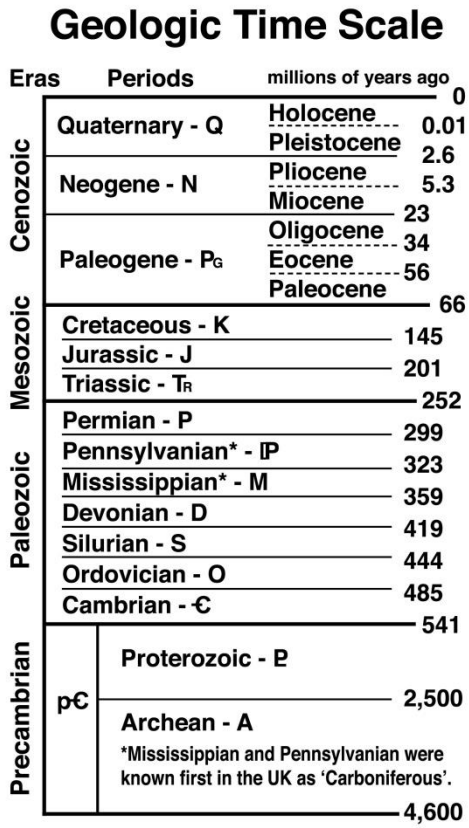

Figure 3. Geologic time scale, showing that Precambrian time represents at least 4,059 years of the ~4,600 years of Earth's history (88 percent). Scale was provided with permission from Ken Wolgemuth.

Putting all this time into just one day (the Third Day) of the Genesis Week makes no scientific sense and makes the Creator into an overworked magician, doing miracles at supersonic speeds. For example, see also a study of Precambrian rocks in this link: http://www.csun.edu/~vcgeo005/Collins5.pdf

In the article in this link, the origin of magnetite concentrations (iron ore) in the limbs of the Split Rock Pond anticline in Precambrian rocks in New Jersey is described (**Figure 4**).

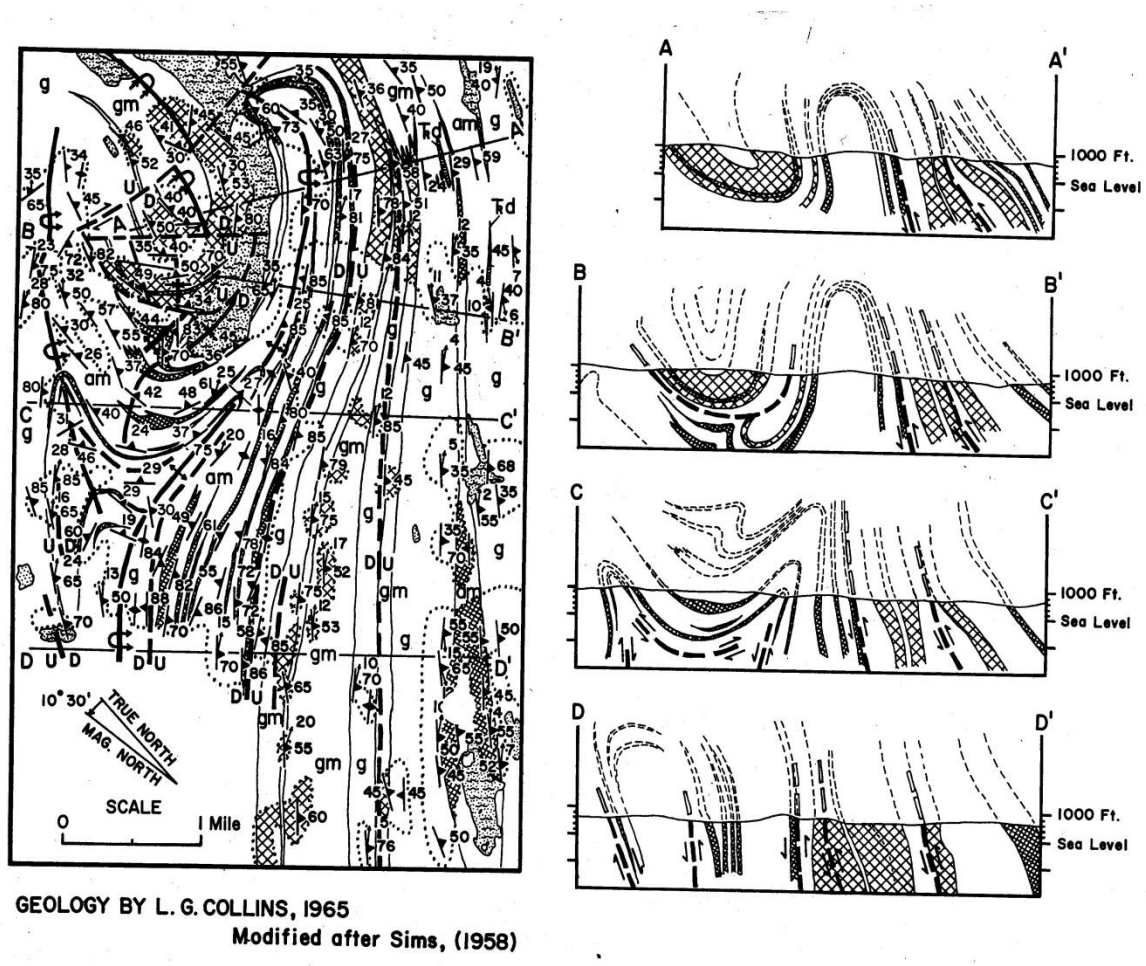

Figure 4. Geologic map and four cross-sections of the Split Rock Pond anticline in New Jersey.

These rocks are former sedimentary and igneous rocks that must have undergone the following sequence of six different processes to reach the final rock positions that are exposed there. (1) weathering of older rocks, transportation of eroded sediment, and deposition of this sediment in layers in a basin, (2) extrusion of basalt lava on tops of these sediments at least eight times in different levels during the creation of the sedimentary rock layers, (3) deep burial in the crust where high temperatures and high pressures converted the sedimentary rocks into gneisses and the lava flows into amphibolites, (4) strong folding of all these rock layers into a tight isoclinal fold, (5) the introduction of hot hydrous fluids into micro-fractured minerals in the limbs of the anticline to extract iron from iron-rich ferromagnesian silicate minerals and concentration of this iron in magnetite ore abundances, and then (6) uplift, tilting, and erosion of these rock layers to expose them at the Earth's surface.

All geologic features observed in these Precambrian rocks can be explained by physical laws operating under natural conditions. Therefore, these Precambrian rocks must have formed and were subjected to the six different geologic processes during millions of years and were not created nearly instantaneously during the Third Day of the Genesis Week.

Oxygen In Earth's Atmosphere

If the Bible is a true science text, as Cupps seems to profess, nowhere in Genesis 1 is it said when oxygen accumulated in the Earth's atmosphere. Genesis 1 reports that light, water, earth, sun, moon, stars, and life are formed but not the formation of oxygen which is necessary for modern life. If the Bible is truly a science text, should not this kind of information have been presented in the Bible? It should be obvious from the information provided in the following link that millions of years were required before the conditions were just right for oxygen to first appear. See: http://www.csun.edu/~vcgeo005/Nr40tillites.pdf

And, if the Bible is a science text, why does it wrongly report what the function of the heart is? See: http://www.csun.edu/~vcgeo005/heart.html

Conclusion

In his book, Cupps chooses data that he believes support his model of a young Earth, but he ignores, failed to hunt for, or is not familiar with published scientific data that do not support his model. That is not the way that proper scientific studies are done.

A supernatural origin of the Earth during 6,000 years is not necessary for Christian belief, and although Cupps implies that all scientists who support the validity of ages determined by radiometric decay methods are *secularists* (supposedly non-Christian), but, many, if not most, are dedicated Christians, including myself. It is ridiculous to think or believe that on Day Three of the Genesis Week that the Creator did all six geologic processes that had to have happened to form the rocks and structures in the Split Rock Pond anticline in New Jersey when radiometric dating shows these events had to happen in the range of 1,000 to 1,400 million years ago in the Grenville Province (**Figure 5**). This figure also shows that what happened in Grenville time is only a very small part of Precambrian history that involved multiple plate tectonic events with many cycles of rocks moving through sedimentary, metamorphic, and igneous histories. For Cupps to say that the Creator did all of these events supernaturally on Day Three of Genesis Week, is nonsense.

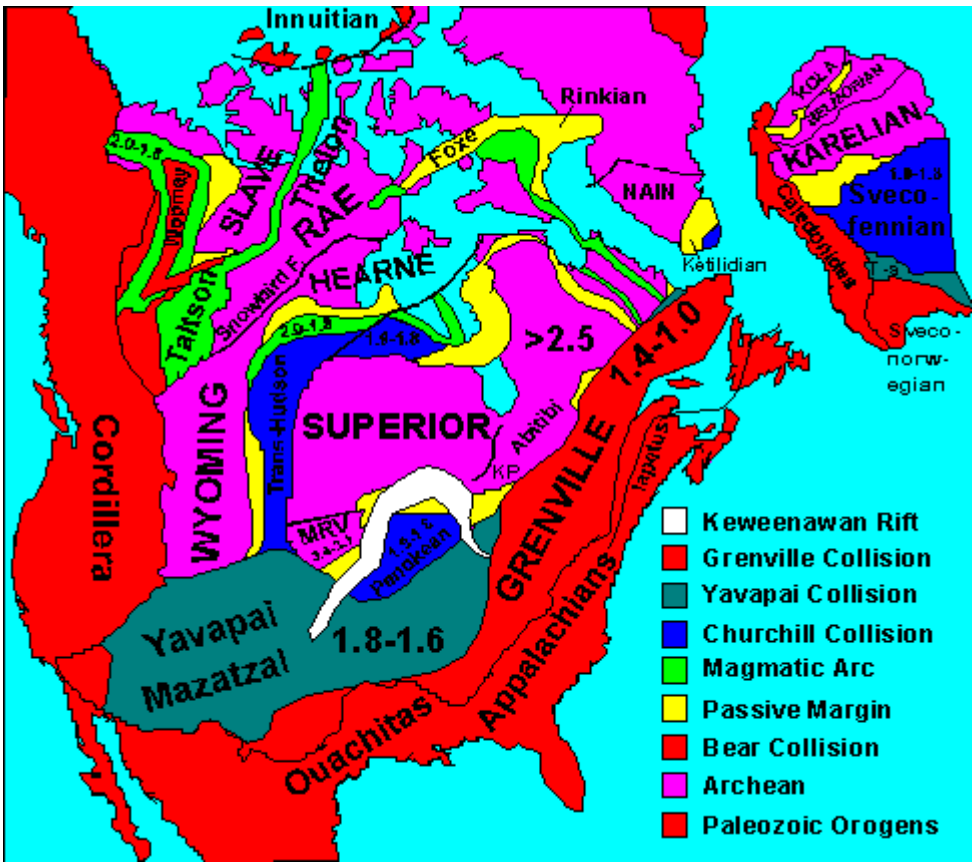

Figure 5. Radiometric ages of rocks in North America. Source from images of North America geology. See: https://www.google.com/search?q=map+of+north+america+precambrian+geology+ages&rlz=1C1EJFA_enUS695US695&oq=m&aqs=chrome.0.69i59j0j35i39j69i60j69i57j69i60.2604j0j8&sourceid=chrome&ie=UTF-8

On the basis of the data presented in this article, it needs to be emphasized that this article is not meant to suggest that the Bible cannot be trusted but that Cupps' interpretation of what is written in the book of Genesis in the Bible cannot be trusted. As a nuclear physicist, Cupps must fully know the dependability of the Creator's natural laws and has used these laws in all his research. Moreover, although the Bible teaches that the Earth is flat and has corners https://bible.knowing-jesus.com/topics/Four-Corners and that the sun physically orbits the Earth each day (Ecclesiastes 1:5; Psalms 19:4-6) and can stand still (Joshua 10:12-13; Habakkuk 3:11), Cupps must have rejected these teachings long ago as being false and merely represent the scientific knowledge that biblical

writers had when they wrote what is written in the Bible and that these writers can still be inspired and have the freedom to describe events in non-scientific ways to make their points that often have great theological meaning. On that basis, the Bible must be interpreted by recognizing the times and context in which each book in the Bible was written.

One of the last messages that Jesus said to his disciples is:

"I have many more things to say to you, but you cannot bear *them* now." (John 16:12)

Being one with God, Jesus would have known all the modern science that we know today, but if he told this information to his disciples, they would have thought him to be crazy.

I agree with Galileo Galilei who said: "I do not feel obliged to believe that the same God who has endowed us with senses, reason, and intellect has intended us to forego their use."

As rabbi Marc Gellman says: "Tethering our faith to an ancient and discredited science only assures us of an ancient and discredited religion."

Finally, as William Newsome, a neurobiologist at Stanford University, says: "Your faith should be informed by science. It should not be replaced by science."

Although Cupps says that young people have left the Baptist Church because of what they learned in secular schools, my observation is that these youth consider the leaders and members of many Christian churches (more than just Baptist) to be hypocritical and do not teach the truth and have left the church for that reason. I know this to be true because a friend of mine left the Methodist Church as a youth when a pastor told him that he had to believe in a literal interpretation of Genesis 1 and that Noah's flood was worldwide. Because he could not believe this, he became an atheist. I know that Cupps is a well-meaning Christian, as I am, but Christians should be witnessing to Christ teachings with truth.

Jesus said: (John 8:32-32) [31]…"If you abide in my word, you are truly my disciples, [32]and you will know the truth, and the truth will set you free." Science is another book written by the Creator that answers questions of when, where, and how, whereas the Bible answers questions of why and who. They are not in

conflict but reveal an awesome Creator. Unfortunately, Cupps' book is still promoting false teaching that cannot be believed.

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