Lorence G. Collins Wikipedia Excerpts

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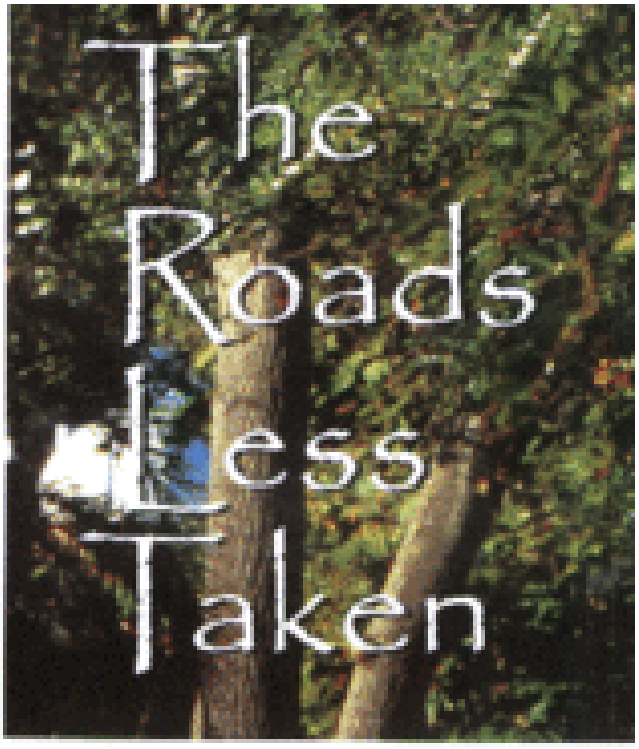

"Two roads diverged in a wood, and I --- I took the one less traveled by... And that has made all the difference."
Robert Frost "The Road Less Taken"

The following gives excerpts in English about Lorence G. Collins that occurs in a Wikipedia report on him written in the German language.

Biography

Lorence Gene "Larry" Collins was born November 19, 1931, in Vernon, Kansas, is an American petrologist, and is best known for his extensive research on metasomatism. He studied geology at the University of Illinois in Urbana where

he earned a B.Sc degree with high honors in 1953 and then a M.S. in 1955 and a Ph.D. in 1959. His Ph.D. thesis dealt with the metasomatic origin of magnetite (iron oxide) concentrations in the Lyon Mountain Granite near Ausable Forks, New York.

In 1960, he took a teaching position at San Fernando Valley State College in a two man Geology Department that later became California State University Northridge in which the department in 2019 now has 14 faculty members. He taught mineralogy, petrology, and remote sensing He started out as an assistant professor in 1959, became an associate professor in 1962, and a full professor in 1966. He served both as a secretary of the faculty and president of the faculty, and retired from teaching in 1993, having taught for 33 years.

In the January issue, 1966, he published an article in the National Geographic magazine titled: "Finding Rare Beauty in Common Rocks."

Since 1972, he has been working on the enigmatic mineral intergrowth myrmekite, which led to many new discoveries in the field of granite petrology. He especially questioned the idea that all granite masses of large size had a magmatic origin and shows in his studies of metasomatism that some granite masses are formed below melting temperatures on a very large regional scale.

In 1955, he married Barbara J. Schenck, a botanist, who took a teaching position at California Lutheran University in 1963 where she taught for 50 years before passing away in 2013, and they have five children. Together they created a website that has more than 10,000 images for the identification of wildflowers in southern and northern California, Washington, and Canada. See: https://earth.callutheran.edu/Academic_Programs/Departments/Biology/Wildflowers/.

Scientific discoveries

In 1972, Collins started to do research on rocks near Temecula, California, where he found myrmekite occurring in a granite mass. Myrmekite (**Figure 1**) is a two-mineral intergrowth of plagioclase feldspar and quartz.

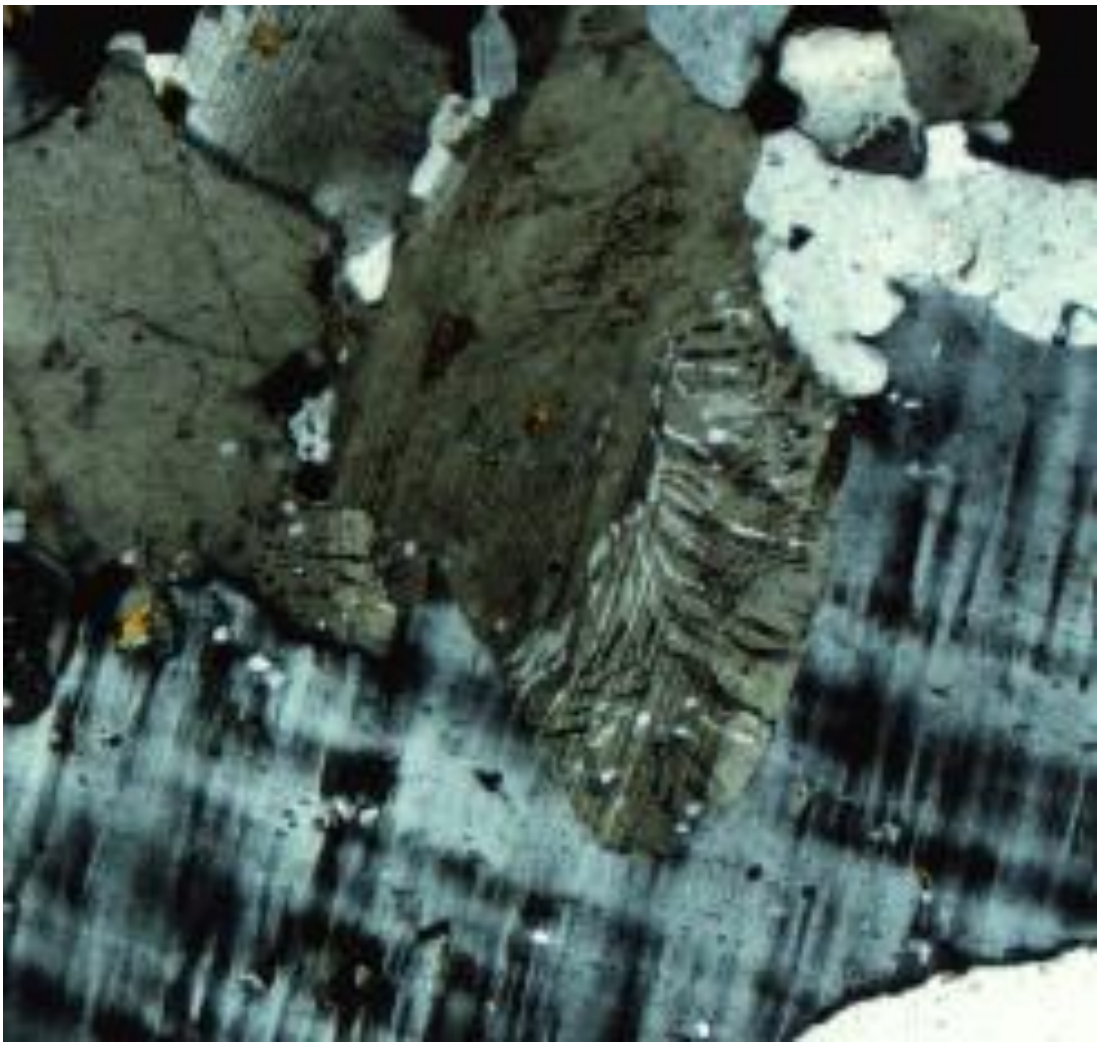

Figure 1. Wartlike myrmekite (center) with tiny quartz vermicules (white grading to black) in plagioclase (light tan) from Temecula, California. Plagioclase in the myrmekite is optically continuous with quartz-free, albite-twinned plagioclase (tan, top). The myrmekite projects into K-feldspar (microcline), black-gray-white, grid-twinning, bottom. Magnification 40x; image width 4.5 mm.

Myrmekite here did not fit the usual accepted models for its origin, either being formed by exsolution from primary K-feldspar or by Na- and Ca-metasomatism along the margins of primary K-feldspar. His extensive studies by thin sections, cathodoluminescence, electron-microprobe, and scanning electron images supported an entirely different model in which K-metasomatism of primary plagioclase produced the myrmekite.
http://www.csun.edu/~vcgeo005/Nr56Metaso.pdf These investigations and the

field relationships convinced him of an entirely different origin of myrmekite from that generally believed by most geologists. Subsequently, he received fierce opposition from the established petrology community. Therefore, he decided to write books, and in 1997, he created his own electronic journal on a website and published his findings digitally http://www.csun.edu/~vcgeo005/index.html

Scope of scientific research

Being in California, Collins naturally centered a lot of his research around the American Southwest, but he also carried out more work in the northeastern States, outside the U.S. where he did studies of granitic rocks in Canada, (Alberta, British Columbia, and Ontario), in Europe (Greece, Ireland, Norway, and Scotland, in Azerbaijan, in Iran, and in Australia. The rock types Collins worked on are mainly granitoid, gneisses, augen gneisses, mylonites, and metasedimentary rocks.

On the above website, he so far has authored and coauthored with his wife more than 50 scientific articles. (See **Scientific publications** at end of article.) In his very last update (2018) Collins adds to the three known models of myrmekite origin a newly discovered fourth model. These four models include:

(1) K-metasomatism of primary zoned plagioclase

(2) Na- and Ca-metasomatism of primary K-feldspar

(3) Ca-metasomatism of primary relatively-more-sodic plagioclase in anorthosite

(4) subtraction of Ca and some Na from deformed, primary, zoned plagioclase crystals occurs in rocks that have been subjected to strong cataclasis

Results

The research Collins has carried out on myrmekite is of far-reaching importance because it directly concerns the genesis of granites − a central problem in igneous petrology. His major results can be summed up as follows:

(1) Collins does not question the magmatic origin of most granitoids by cooling down melt crystallized at the eutectic. But for Collins, this may not be the final step in the evolution of granitic rocks.

(2) It is generally known that feldspars also can form below the solidus in a temperature range of 650º C down to 450º C, i.e., below the eutectic.

(3) In his studies Collins shows that hot metasomatic fluids (especially fluids rich in K and Si) can attack magmatically formed minerals and induce exchange reactions.

(4) The formation of myrmekite and quartz sieve textures in biotite and hornblende are the first indications that this exchange process is underway. The exchange reactions are not necessarily confined locally but can become regionally important. They can change mafic rocks like gabbros and diorites gradually into more silica-rich rocks. A good example is the Wanup pluton near Sudbury Ontario, that underwent a change from diorite/gabbro quartz to form quartz monzonite/granodiorite. See: http://www.csun.edu/~vcgeo005/Nr40Wanup.pdf

Of prime importance is his discovery of the positive correlation between the thickness of the quartz vermicules in the newly formed myrmekite and the calcium contents (An value) of the primary plagioclase in the surrounding granitoid. Models that try to explain the formation of myrmekite either by exsolution of calcium and sodium from primary alkali feldspar or by a calcium and sodium substitution reaction within alkali feldspar cannot explain this positive correlation.

On the other hand, by heating and micro-fracturing the country rocks, metasomatic reactions set in long before anatexis (melting) is reached A good example is the Cooma Granodiorite in southeaster Australia. http://www.csun.edu/~vcgeo005/Nr27Cooma.pdf **Figure 2** shows myrmekite in the Cooma Granodiorite.

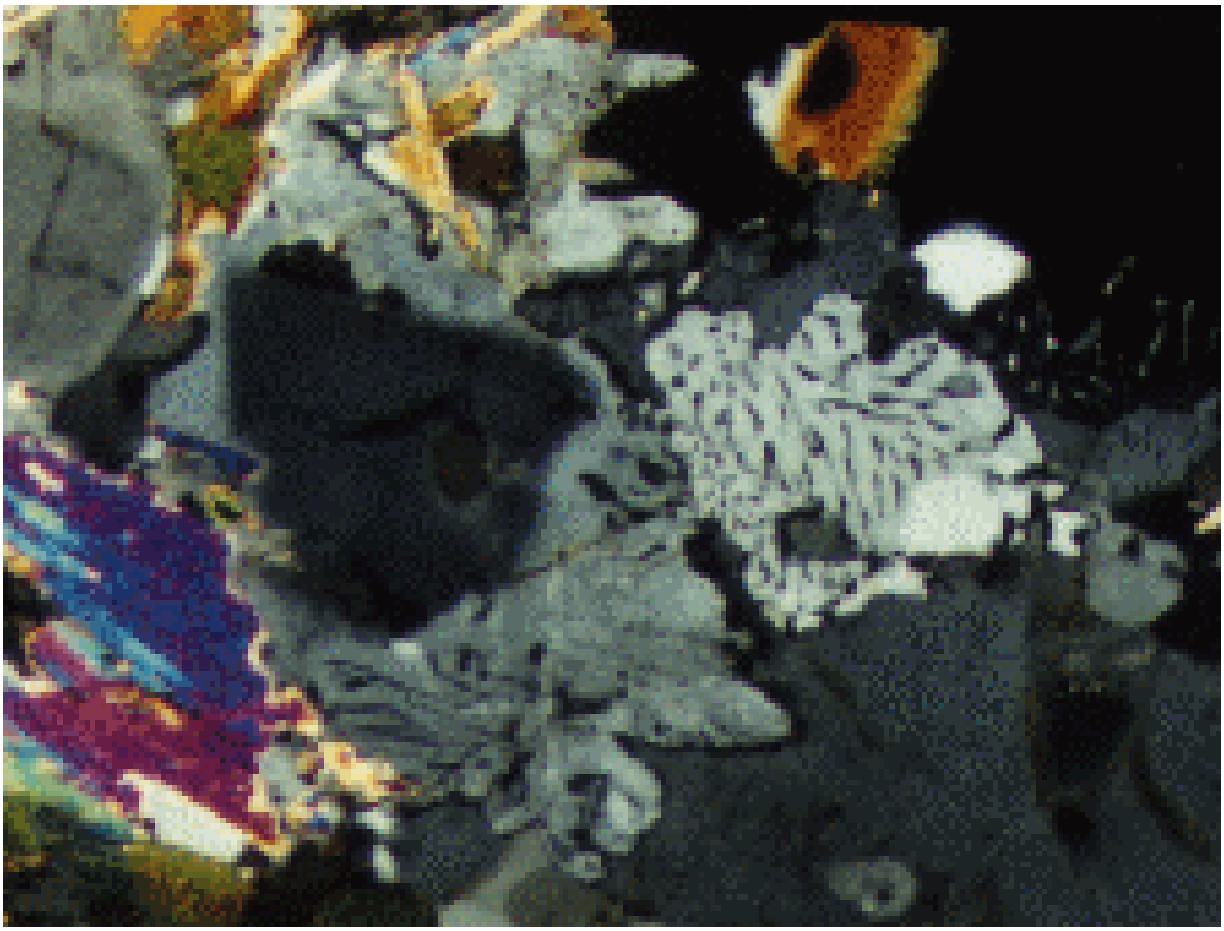

Figure 2. Myrmekite (white and gray, with worm-shaped quartz stems) borders. Orthoclase (K-feldspar; gray, right side). Zoned plagioclase with calcium-rich core (dark gray, left side) with broad sodium-rich edge (light gray). The colored grains are biotite and muscovite. Cooma Granodiorite, Australia. Magnificaton 40x; image withdth 4.5 mm.

Collins showed how the local metasediments were affected by metasomatic exchange reactions to the point that they were changed into granodiorite and migmatite. Of prime importance here is the fact that the Cooma Granodiorite never reached the melting point, but solely resulted from exchange reactions where hot hydrothermal fluids brought in K and Si ions and subtracted Ca, Fe, and Mg ions

Collins also highlights the outstanding role of tectonic deformations. Only deformed rocks enable metasomatic fluids to become fully effective. Brittle deformations (like cataclasis, fracturing, and faulting) followed by ductile

processes (like folding, shearing in shear zones and shear bands and mylonitization) pave the way for solutions to enter crystal lattices.

Surprisingly, among established petrologists, Collins met some quite strong resistance to the above processes to form granitic rocks, although there is no doubt about the effectiveness of metasomatic processes in some places. Good examples are fenites that originate by Na-K metasomatism and skarns, whose metasomatic origin is generally unquestioned Collins, therefore, posits two questions.

(1) In order to explain enriched basaltic magmas most petrologists assume a metasomatically altered (i.e., enriched) mantle − an example being net-veined peridotite. So, if metasomatism is strongly altering mantle rocks, why shouldn't it affect crustal rocks?

(2) Sodium metasomatism is widely accepted; so, why isn't complementary potassium metasomatism, although both elements behave chemically in very similar ways?

Collins found one example of Na- and Ca-metasomatism near Alastaro, Finland, where primary K-feldspar phenocrysts in granite pods enclosed in gabbro had been deformed and micro-fractured so that more than 60% of the interiors of these phenocrysts (3 cm long) were replaced by myrmekite (**Figure 3**).

Figure 3. Mosaic of more than 100 magnified (40x) images that are assembled to stretch for 6 feet across a wall and show the many grains of myrmekite in the interior of a K-feldspar megcryst 3 cm long near Alastaro, Finland.

Collins found a myrmekite-bearing granitic rock in which it is clear that K-feldspar (microcline) replaces plagioclase feldspar (**Figure 4**).

Figure 4. Microcline (top and left, black, and grid twinning) penetrates along an irregular contact area into primary plagioclase (bottom, light gray, speckled, and having faint albite twinning) and replaces it. In addition, veins of K-feldspar (black) penetrate into the plagioclase. Of importance is the relict-preserved plagioclase zoning (curved aeas) in the microline (center of image), which can not be explained by a magmatic origin of the two feldspar minerals. Magnification 40x; image width 4.5 mm.

Debate on creationism

Collins is of the Methodist faith and due to his geological training is strongly opposed to young-Earth creationism. He has created a website in Opposition to Creationism http://www.csun.edu/~vcgeo005/creation.html in which he discusses various aspects of creationists' theories concerning literal readings of the Bible or supernatural explanations, and each of these is demonstrated to originated by natural processes or to have a modern science interpretation. Among these articles is one that presents his own Christian philosophy; see #8 iin the publication list.

Noachian Flood

In addition to his discussions of creationism in his website, he says that a worldwide deluge myth or *Noachian Flood* cannot have happened, but that it could have occurred as a large local flood in southeastern Mesopotamia (Iraq) where Noah could have built his ark in the Garden of Eden. The combined flood plains of the Euphrates and Tigris Rivers from 80 miles (100 km) north of Baghdad to the Persian gulf are up to 170 miles (270 km) wide, and the river gradients from Baghdad to the gulf (a distance of 425 miles (680 km) are less than 1 foot per mile (200 mm/km) and mostly as little as 0.14 feet per mile (30 mm/km). Therefore, the land in this area is so flat that during a huge storm and resulting large flood, water coming from the surrounding mountains in Egypt, Syria, Iran, and Turkey, would have piled up. Villages along natural levees of the rivers would have been inundated under several feet (meters) of water. Moreover, because of the curvature of the Earth, no land 85 miles (100 km) away from either sides of the rivers would have been visible from any large boat floating in the water. On that basis, for any survivors of the Flood, the whole world would have been under water, and that part of the Earth would have been their whole world.

Polonium halos

Polonium halos have been used by young-Earth creationists as evidence that granite (and the Earth) were created almost instantaneously on Day Three of the Genesis Week. This idea was promoted by Robert V. Gentry, physicist, who studied Po halos in biotite (and fluorite) in granite pegmatites. Polonium (Po) is a natural element which has several different radioactive isotopes, among which are

^{218}Po, ^{214}Po, and ^{219}Po (with masses of 218, 214, and 210). These isotopes are the last three "daughters" in the eight-step radioactive uranium (^{238}U) decay scheme before the stable isotope (^{206}Pb) is formed. In each decay step in which a new isotope of different mass is formed, heavy alpha particles (helium nuclei) with a mass of 4 are shot out from the nucleus like high-energy cannonballs. Where polonium is found in biotite mica, these cannonballs damage the biotite lattice structure to produce a glass that is visible as a black halo, provided that enough polonium (about 1,000,000,000 to 10,000,000,000 Po atoms) was originally present at a nucleation point.

The halo radius of damage is different for each of the different polonium isotopes. Therefore, if three, two, or one of the Po isotopes are present, then three different Po-halo ring-type halos might be present with three rings, two rings, or a single ring. Although Po halos are three of the eight possible halos of damage that are created by eight different daughter isotopes where uranium (^{238}U) is nucleated in zircon or uraninite crystals in a biotite crystal, in some places the three Po halos occur in biotite crystals completely isolated from where uranium has nucleated. This special occurrence of isolated halos in biotite is the basis for Gentry's assertion that granite was formed on Day Three nearly instantaneously.

His reasoning is as follows:

Where granite crystallizes from a large body of magma several miles deep in the Earth's crust, the cooling time before biotite first begins to crystallize is thought to be at least 5 million years. On that basis, if the half-lives of ^{218}Po, ^{214}Po, and ^{210}Po are 3.05 minutes, less than 200 microseconds, and 140 days (respectively), no matter how much original polonium could have been present in the initial magma, all these Po isotopes would have decayed to stable lead (^{206}Pb) long before they could nucleate in late-forming biotite crystals in sufficient quantities to form visible Po halos. Because most granite petrologists believe that large bodies of granite must crystallize from magma, and this model is the generally accepted theory for the formation of granite, Gentry's reasoning is quite logical. For him, the granite containing Po halos cannot have formed from a melt (magma) and must have formed almost instantaneously during Day Three and provided evidence for a literal interpretation of the Bible.

However, research by Collins suggests that not all granite bodies of large size are formed by crystallization from magma (see **Results** section above). In

some places *granite can form at temperatures below melting conditions* where former solidified igneous rocks have been deformed and micro-fractured to open up the system for movements of fluids. In these places, if uranium is relatively abundant in these rocks, it also releases radioactive radon (^{222}Rn), which is an inert gas that freely moves through the fractures. Because ^{222}Rn is the precursor to ^{218}Po, its free movement readily facilitates the natural formation of Po halos. That is, in those places where the former igneous rocks have relatively abundant scattered uranium, during the conversion of these rocks into granite by chemical replacement processes, the open system allows radon gas to migrate in fluids to where biotite is being crystallized or recrystallized and where polonium isotopes derived from the nearby radioactive radon can precipitate in the biotite lattice. Therefore, the three different kinds of Po halos can form naturally in biotite during thousands (or millions) of years while deformation and chemical replacements are occurring without any requirement for instantaneous crystallization on Day Three. *In all these places where Po halos in biotite crystals occur, Collins has found myrmekite to be associated with the granitic rocks*.

Thus, the combination of myrmekite and Po-halos (neither of which can form from a granite magma) becomes a strong indicator that not all granite bodies of large size need be formed from magma.

Scientific publications (selections)

Some of the following can be accessed by going to the website "Opposition to Creationism" at the following link and looking for the number of the article listed in a red font. http://www.csun.edu/~vcgeo005/creation.html

- Collins, L. G., 2019, *Myrmekite in the Sherman Granite in Wyoming-Colorado*. #58 in http://www.csun.edu/~vcgeo005/index.html.
- Collins, L. G., 2019, *Critical Analysis of the book "Rethinking Radioactive Dating" by Vernon Cupps*.#59
- Collins, L. G., 2019, *Understanding the natural ancient origin of oil versus a biblical Genesis Flood origin of oil* #58
- Collins, L. G., 2018, *Reply to Andrew Snelling's arguments regarding cliffs formed in the walls of the Grand Canyon*. #49
- Collins, L. G., 2018, *Analysis of article "Grand Canyon Carved by Flood Runoff" by Tim Clarey*. #48

- Collins, L. G., 2018, *Origin of the Coconino sandstone in the Grand Canyon*. #47
- Collins, L. G., 2018, *Good science versus bad science and the Genesis flood story*. #46
- Collins, L. G., 2018, *Biological Reasons Young-Earth Creationists' Worldwide Flood Never Happened*, Skeptical Inquirer, September/October 2018, pp. 52-57 #45
- Collins, L. G., 2018, *Response to Ken Ham and YouTube comments by Andrew Snelling*. #42
- Collins, L. G., 2018, *Glacial tillites, geologic history, and biblical scientific accuracy*. #40
- Collins, L. G., 2015, *When Was Grand Canyon Carved - Millions of Years Ago or Thousands of Years Ago? How Do We Know?, Reports of the National Center for Science Education, v. 35, issue 4 #32*
- Lorence G. Collins and Barbara J. Collins, 2012, *More geological reasons Noah's flood did not happen*, Reports of the National Center for Science Education, v. 32, issue 6, p. 1–12 #26
- Lorence G. Collins and Barbara J. Collins, 2011, *Pleistocene Continental Glaciers: A Single Ice Age Following a Genesis Flood or Multiple Ice Ages?*, Reports of the National Center for Science Education, v. 31, issue 5, p. 1–11 #24
- Lorence G. Collins and Barbara J. Collins, 2010, *Origin of Polonium Halos*, Reports of the National Center for Science Education, v. 30, issue 5, p. 11–16 #20
- Collins, L. G., 2009, *Yes, Noah's Flood May Have Happened but Not over the Whole Earth*, Reports of the National Center for Science Education, issue 5 #18
- Collins, L. G., 2009, Yes, Noah's Flood May Have Happened but Not over the Whole Earth, #15
- A challenge from a person holding a Th.D degree #12
- Christianity and science − are they contradictory? #11
- Salt, Pepper, and Blah #8
- Polonium halos and myrmekite in pegmatite and granite #4
- Collins, L. G., 1997, *Muscovite-garnet granites in the Mojave Desert: Relation to crustal structure of the Cretaceous arc: Comment*, Geology, v. 25, 187 p.
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- Collins, L. G., 1989, *Origin of the Isabella pluton and its enclaves, Kern County, California*, California Geology, v. 42, p. 53–59
- Collins, L. G., 1988, *Myrmekite, a mystery solved near Temecula, Riverside County, California*, Geology, v. 41, p. 276–281
- Weigand, P. W., Parker, J. and Collins, L. G., 1981, *Metamorphic origin of garnets in the Lowe granodiorite, San Gabriel Mtns., California*, Transactions of the American Geophysical Union, v. 62, no. 45, p. 1060
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- Collins, L. G., 1966, *Finding Rare Beauty In Common Rocks*, National Geographic, v. 129, no. 1, January, p. 121–129
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- Hunt, C. W., Collins, L. G., and Skobelin, E. A., 1992 *Expanding Geospheres*, Polar Publishng, 421 pages.