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The Problem of Orphan Genes

by Jerry Bergman

Genetic information is so detailed that questions often arise as to where it came from. Genes may either be homologues to genes in other species (similar in composition to genes in other organisms and assumed to have originated from a common source), or they may be entirely different. These different genes are called orphan genes. Orphan genes (often spelled ORFan genes) are species specific genes that are significantly different from all other known genes, and are thus genetically isolated from the enormous set of genetic possibilities.


Louis Reed - #unsplash

Evolutionists believe that all new functional genes have evolved from earlier genes as genomes have become larger in time. It is their view that the first genome was less than a few hundred genes, such as exist in viruses today. That number evolved (they say) into a few thousand genes in bacteria and eventually these evolved to over twenty thousand in vertebrates (animals with back bones).

In harmony with this postulate, it was assumed for decades by Darwinists that all new genes have slowly evolved by gradually modifying previously existing genes in a Darwinian evolutionary fashion. One theory of gene creation is that when a gene duplicates, it may allow one copy to undergo evolution until mutations create a new function for the copy (Ohno, 1970). Thus, orthodox evolution theory taught that all genes come from other genes, and for this reason all genes will be homologues to the genes they evolved from (Guerzion and McLysaght, 2011). Specifically, it was predicted that, due to the "explosive increase in genomic data and rapid advances in molecular genetic technology, the manifold and fundamental roles of gene duplication will become even more evident and the once imaginative idea of evolution by gene duplication will be established as one of the cornerstones of evolutionary biology. This was the standard story until a few years ago." (Zhang, 2003, p. 297). New information, especially the discovery of orphan genes, has forced a modification of that story. Other explanations for the origins of new genes besides gene duplication include "exon shuffling, retroposition, mobile elements, lateral gene transfer, gene fusion/fission, and de novo origination." Wu et al, 2011, p. e1002379). All except the last of these explanations involve changes to existing genes.

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Magnificent indeed! And certainly not mundane!

During his second lecture at Creation Weekend 2018, Dr. Gordon Wilson stimulated our appreciation of the creation with his presentation entitled "The Magnificence of the Mundane" The words in the title, he pointed out, are actually contradictory. While the word "magnificence" communicates excitement, the term "mundane" suggests that something is boring or dull. But what he wanted to share with us is that God's work in creation is amazing, displaying God's wisdom and finesse (Ps. 104:24). And in this context, we are told that King Solomon, full of wisdom, spoke about trees, herbaceous plants, beasts, birds, reptiles and fish (I Kings 4:33).


Nick Abrams - #unsplash

It is evident, declared Dr. Wilson, that one place to observe God's wisdom, is in nature. Similarly, Dr. Wilson pointed out, if one wants to be an expert on Renaissance artist Michelangelo, one will endeavor to study his creative works in addition to any of his writings. Thus, said our speaker, biology is a part of theology. It is the study of who God is as an artist, engineer and sculptor. In this context, Dr. Wilson discussed several organisms that might seem mundane or ordinary, but are actually quite amazing.

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We Don't Need a Big Bang!

Some people actually like numbers and mathematics, and some people don't. Everybody knows that! Some people however sound positively lyrical on the subject of numbers. Beyond the practical and theoretical challenges that mathematics provides however are the insights into nature. As Dr. Kurt Wise pointed out in *Faith, Form and Time* (2002) "The universe seems to operate with mathematical precision, and natural laws have a mathematical form." (p. 91) Astronomer Dr. Timothy Ferris elaborates on mathematics in his 1997 book *The Whole Shebang:* "[M]athematics [is] a codified form of logic that embodies the faith of science that nature works in a rational way." He adds "Like all scientific theories, relativity is expressed in terms of mathematical equations- "

Given the impressive credentials of modern physics and cosmology, many Christians are truly confused and conflicted as to the significance of conclusions concerning a big bang beginning to the universe which seem to come from relativity theory. But a new book from Dr. Jason Lisle *The Physics of Einstein* (2018 Bible Science Institute) informs us that "The physics of Einstein tells us something profound about the truly awesome mind of God." (p. 10) Thus Dr. Lisle undertakes to discuss "the wonderful 'weird' effects of relativity and prove that these effects must occur." (p. 9) We can't avoid reality, he declares.

Not surprisingly perhaps, Dr. Lisle then proceeds to discuss relativity theory in detail. He concludes that "It is quite wonderful that God has designed a universe that works perfectly with no genuine contradictions and that is nonetheless counterintuitive to us. It humbles the human mind." (p. 62) [Counterintuitive means against our common sense expectations]

Many will then ask if this means that the big bang theory is correct. Indeed not, declares Dr. Lisle. It is "a mistake to claim that general relativity proves or implies a big bang. It doesn't." (p. 182) He further elaborates that without the assumptions of naturalism "there is nothing in Einstein's field equations that requires the universe to have started from a point or to be billions of years old. And nothing in general relativity is inconsistent with the biblical history that God supernaturally created the universe a few thousand years ago." (p. 182)

This raises the question of the size and age of the universe. Dr. Lisle declares that the answer lies in the one-way speed of light. Having established from the relevant equations that we can conclude that "As strange as it may seem, it appears that the one-way speed of light is not a property of the universe, but rather a humanly stipulated convention." (p. 235)

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Greg Rakozy - #unsplash

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Learning lots all year!

by Margaret Helder

Do you like to watch your favourite team show off their talents? Are you happy when they win? Sometimes it's fun to be a spectator. All you have to do is cheer. Let's be spectators in temperature races featuring that special competitor, the yeast cell.

Yeast is a tiny mold made up of a single cell. Yeast has the remarkable ability to turn sugar into alcohol and carbon dioxide gas. If there are more yeast cells, naturally, sugar is turned into alcohol and carbon dioxide gas at a faster rate. The happier the yeast is kept, the faster it grows and the more product it produces. Let's see if temperature has any effect on how happy the yeast is and thus on how fast it grows and how much product it produces.

Your supplies will include styrafoam bowls (at least 5), weighing balance, thermometer, measuring spoons, measuring cups, plastic spoons, stir sticks, yeast (fresh dry yeast), sugar and water, warm and cold.

You start by placing one half cup of water at 10 degrees C in a bowl. Add 10 ml or 2 tsp of sugar. Stir until the sugar disappears. The sugar is now in solution in the water. (You can tell by the sweet taste that the sugar is still there, only you can't see it.) Add 30 ml or 2 tbsp of yeast to your bowl and weigh the bowl right away. Leave the bowl on the scale. Record the weight and allow the bowl to sit 10 minutes. Record the weight again. Is there any change? This bowl was Team A.

Next do the same thing with water that is at 20 degrees C. This was team B.

Next do the same thing with water at 30 degrees C. This was team C. Lastly do the same thing with water at 40 degrees C. This was team D. If you are really keen, try the same thing with water at 45 degrees C. This is team E.

Why do some of the teams suffer a loss of weight? Make a graph which plots weight loss against temperature. (temperature on the horizontal axis and weight loss on the vertical axis) Oh yes, the winner is the team with the most weight loss.

The happier the yeast is, the faster it will grow. That means more cells all happily digesting sugar and turning it into alcohol and gas. The amount of gas produced is an indication of how fast the yeast is growing.

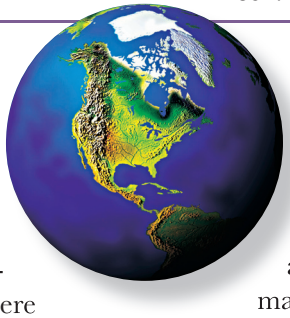
Have you measured anything that gives you an indication how fast the yeast is growing? Final clue … the faster that gas is produced, the faster it escapes from the water and thus the more weight that is lost. Thus, the biggest loser is actually the winner!

Can the yeast grow indefinitely in your system? What will stop the reaction?

What would happen if you regularly removed some of the old liquid and then added an equal amount of fresh sugar solution.

There is a song that says "You can learn a lot of things from the flowers, especially in the month of June!" But here you can learn a lot of things from a simple fungus, the yeast cell. And we can do it at any time of the year!

We Don't Need a Big Bang! *continued*



Thus when he inserts the perfectly permissible speed of light as infinity into the relevant equation "[U]nder this system all events everywhere in the universe are observed in real time." (p. 241) Thus he concludes "Consequently, our ability to see distant galaxies is perfectly compatible with the Genesis account. There is no distant starlight problem." (p. 249) Other specialists including Dr. John Hartnett (2007) (*Starlight, Time and the New Physics)* and Dr. Russell Humphreys (1994) (*Starlight and Time: Solving the Puzzle of Distant Starlight in a Young Universe)* propose other explanations for a young universe, also based on relativity theory.

Many people declare that the details of fancy physics and mathematics are beyond their interests. The default position of many people typically is to assume that the popular account of the big bang is correct. These people may try to dovetail the Big Bang into their Christian faith. But Dr. Lisle demonstrates that such long age conclusions are most unnecessary. The take home message is that none of us needs to be intimidated by widespread and influential support for the Big Bang!

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by Margaret Helder

Congratulate the Chemists!

Every year, it seems, we hear about anniversaries, some obscure and some more significant. But 2019 is big!! It is the 150th anniversary of a major step forward in our understanding of the chemical elements. In March 1869, Dimitri Mendeleev, an obscure Russian scientist, managed to explain chemistry in a way that made sense. Thus, UNESCO has designated the year 2019 as the Year of the Periodic Table of the elements. Some people consider that this single document is one of the most powerful icons in science.

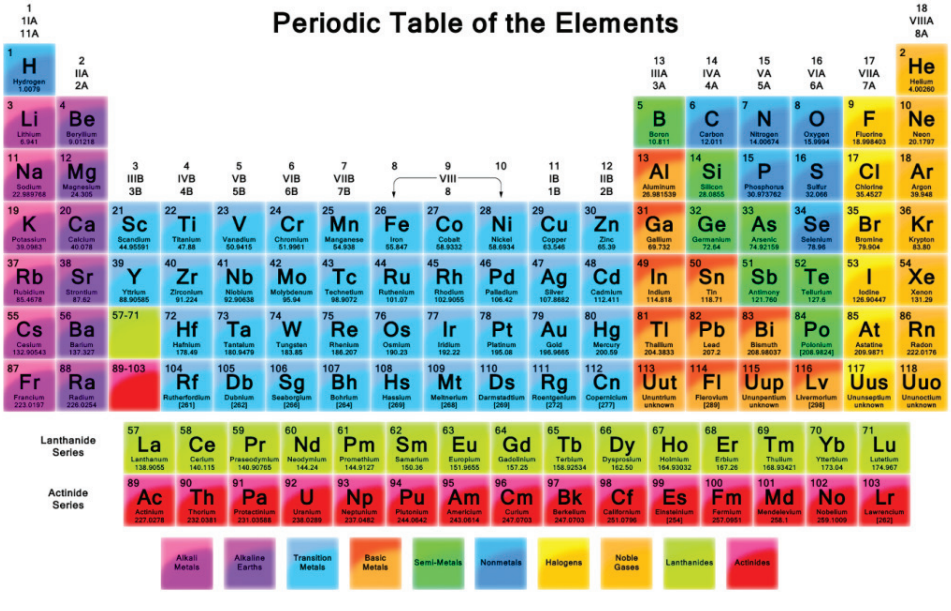
That it should be so useful and relevant after so long a period, is no small achievement. Mostly scientific explanations come and go. In the case of Mendeleev's document however, one commentator declared: "But despite the dramatic changes that have taken place in science over the past century – namely, the development of theories of relativity and quantum mechanics – there has been no revolution in the basic nature of the periodic system…. Remarkably, the periodic table is thus notable both for its historical roots and for its modern relevance." (Eric Scerri. 2011. *Scientific American* January 21)

What is all the fuss about? And why do we care? Naturally Mendeleev's ideas were based on the achievements of others down through the years. Robert Boyle (1627-1691), the fourteenth child of an Irish aristocrat, established chemistry as a science and he developed a definition of an element. Boyle proposed that substances were made up of different elements (consisting of tiny particles which we call atoms) and that these elements could be identified by conducting experiments. He suggested that elements could be combined to make compounds, and compounds could be separated back into their ele ments. These ideas were a big departure from the alchemists who believed that fire, water, earth and air constituted the foundational elements.

The next big leap in our understanding came from Russia. Demitri Mendeleev (1834-1907) was born in Siberia, the youngest of fourteen children (like Robert Boyle). Mendeleev's father died when he was young, but his mother was determined that Demitri would be trained in science. She soon died too, but she urged him to "search for divine and scientific truth." (Gordon Woods. 2007. *education in chemistry* March 1) Whether her son was so motivated, is uncertain, but he never doubted that there had to be a logical explanation for the nature of the chemical elements, and that this relationship could not be the result of chance. (Mike Sutton. 2019. *Chemistry World* January 2)

The expectation that the chemical elements can be expected to react in orderly patterns, may seem obvious to us today, but actually that expectation is based on our understanding of who God is. As Kurt Wise declared in *Faith, Form and Time* (2002) p. 35: "If the physical world did not exist or did not have a consistent pattern that makes it understandable to humans or did not have consistent rules in space and time – or contained no truth at all – studying the physical world would be a futile exercise." It is the Biblical portrait of God who is rational and not capricious, that gives us the expectation similarly that nature will also display logical patterns (because God made it).

So let us return to the work of Men-



deleev to see what he achieved and why. His academic progress was long and hard. However, in 1858 he was awarded a scholarship to study in Heidelberg under Robert Bunsen. There he learned some highly significant skills. Specifically, he learned new techniques in spectroscopy and, as a result, he began to accumulate of lot of information about substances.

Bunsen and colleague Gustav Kirchhoff had improved on the technique called spectroscopy. This procedure involved burning a substance and splitting the resulting light by means of a prism. (When one splits sunlight, for example, one obtains a rainbow of colours.) These men improved the system into a procedure which yielded detailed patterns of the split light (spectrum). They discovered that every element has a unique spectral pattern of separate coloured lines. Thus, they established the technique of analytical spectroscopy which many, including Mendeleev, began to apply.

In 1867 Mendeleev was appointed as professor of inorganic chemistry at St. Petersburg University. Lacking a suitable textbook in Russian, he set out to write his own. Now there is nothing like having to teach something that forces one to think clearly about the issue. Mendeleev had a lot of data concerning elements, but he could not explain what the relationships were. He wrote his information for each element on a separate card and he began to play around with arrangements of the cards. At a conference in 1860, Mendeleev heard Italian chemist Stanislao Cannizzaro present a major paper on atomic weights. Mendeleev incorporated this information on his cards for the elements.

We know now that atomic weights consist of the number of positively charged particles (protons) in the nucleus and the number of neutrons (similar particles but with no electrical charge). It is the number of protons (atomic number) which determines the chemical properties of an element. Nobody then knew any of that, but the atomic weight could be measured, and it was close enough to the atomic number to yield reasonable patterns. These patterns are what Mendeleev and many others were seeking.

In early 1869 Mendeleev laid out his cards in vertical columns of elements with similar properties and increasing atomic weight. Different properties called for a new column. There were no elements with the same atomic weight. If the measured atomic weight did not fit an element into a group with similar properties, he adjusted his data to make the element fit the desired pattern (assuming that piece of information was wrong, which it was.) He also left gaps for elements not yet discovered which should fall into the pattern of properties and weights.

On March 6, 1869 Mendeleev's paper was read on his behalf to the Russian Chemical Society. Few people, outside Russia, paid much attention. Mendeleev called an improved version, printed in 1871, the Periodic Table. Then in 1875 a French chemist published a description of gallium, a new element. Mendeleev had predicted the existence of just such an element with those very properties. After this, chemists began to use Mendeleev's table in their own studies. The data in the table helped them understand their observations. The amazing thing is that the orderly pattern that Mendeleev discerned, is as relevant today as when he first proposed it. However, we now understand why Mendeleev's pattern works, thanks to enhanced understanding of the structure of the atom.

Why mere matter in its nature and interactions should reflect such logical patterns very much makes sense from a Christian worldview. It makes sense that our Creator God established the elegant relationships that Mendeleev elucidated. It does not make sense that they could have developed spontaneously. Who set the rules by which matter operates? An amazing mind of course.

So yes, let's celebrate the sesquicentennial of the periodic table. And be sure to congratulate your chemist friends who continue to benefit from Mendeleev's epic analysis.

For the rest of the story: See https://crev.info/2019/02/design-in-chemistry-explained-by-a-phd-chemist/

Magnificent indeed! And certainly not mundane!

Continued from page 1

The eastern box turtle lives in the eastern half of the United States. This animal may look quite ordinary (as turtle appearances go), but it has an amazing capacity to survive cold winters. As fall gives way to winter, this reptile builds up high levels of glucose in its blood. This acts as an antifreeze which prevents ice crystals from forming in the cells. Ice may build up in the body cavity (but not in the cells). With all this chill, the heart stops. But then in the spring, with melting, the heart starts up again and the turtle goes about his normal life activities.

In keeping with his theme of looking at everyday creatures, what could be more ordinary than houseflies? It turns out however that these organisms have quite an interesting way to escape from the confining walls of the pupal stage. It so happens that there is a trap door fashioned in the skin on the face of the developing fly. Muscles in the abdomen push blood vigorously into the head. This blood fills an inflatable bag which pushes open the trapdoor and bulges from the face. This bag called the ptilinum, exerts pressure on the puparium (a cocoon-like structure formed from the maggot skin which houses the pupa and now the emerging adult). Puparium also has a weakened seam that cracks under pressure of the ptilinum. The new adult pushes out through that hole, the blood retreats back into the body along with the ptilinum and the trapdoor closes back up. Then behold, here we see a normal fly descending on our hamburgers!

More showy, are the hunting habits of the Bolas spiders. These creatures, which look like bird droppings (for purposes of camouflage), share many characteristics with ordinary orb weaver spiders. The Bolas representatives occur throughout the eastern United States down to Chile. At night these spiders, looking every bit like cowboys swinging a lasso, hang from a leaf and swings a bolas (a thread with a glob of sticky glue attached to its end). This amazing spider secretes a very special organic molecule, the scent of a particular female moth. This compound (called a pheromone), acts like a perfume to attract male moths of the same species. The spider deftly swings its bolas and hits the incoming male moth, penetrating his scales. The spider then hauls in her prey and wraps it up in silk. This spider is even able to vary the chemical composition of the pheromone in order to catch another moth species. The ability of the spider to imitate such elaborate pheromone designs, demonstrates that these spiders possess remarkable synthetic abilities that could never have developed by trial and error. Magnificent indeed! And certainly not mundane.

Dr. Wilson discussed spore dispersal in ferns, mosses and in a fascinating little fungus called *Pilobolus*. This little fungus grows on the dung of animals like horses and cows. The entire fungus is only about 1 cm tall, but it consists of a short stalk with a bulging balloon-like area above, topped by a black cap which shelters many fungus spores. The bulgy area focuses light onto carotenoid pigments in its base. The bulge with cap on top, grow straight sideways towards the incoming morning light. Pressure builds up in the bulge so that the cap is shot off at high pressure. Full of spores, the cap lands and clings to grass about 2 m away from the manure. Along comes a grazing animal. The fresh grass looks good enough to eat and once inside the animal, the spores proceed through the digestion system without germinating. Once deposited outside in another dump of manure, more miniature *Pilobolus* specimens grow to start the process all over again.

These examples demonstrate wonderful design and fascinating ingenuity. Yet they are taken from everyday life. Dr. Wilson concluded with the admonition that we should observe the creation and ponder that God made it. God did not give us all the answers, He wants us to explore. As we read in Proverbs 25:2 "It is the glory of God to conceal things, but the glory of kings is to search things out."

In his concluding presentation "A different shade of green", Dr. Wilson declared that Christians should approach the environment keeping two principles in mind: that the environment is to be cherished but at the same time that we must use its resources for the sustaining of mankind. He declared that there is no such thing as overpopulation, just a lack of good government which seeks to balance all the needs. While we should reject greed and unnecessary exploitation, Christians should never seek to depress human populations. However, they will seek to increase our knowledge of and appreciation of all that God has made, even the seemingly ordinary things like woodlands and wild animals.

Michael Podger - #unsplash

The Problem of Orphan Genes

by Jerry Bergman

Continued from page 1

The reason this early view of new genes has changed is largely due to the discovery of an enormous number of orphan genes that showed no evidence of evolving from preexisting genes. The gene duplication theory retains its vitality among Darwinists only because the contrary idea, namely that genes originate by spontaneous mutation, recombination and random genetic drift, has not been supported by the genetic research evidence. The problem orphan genes create for Darwinism is that the probability is miniscule that a functional gene sequence can emerge from a random sequence of the nucleic letters A, T, G, C.

As Wu et al., admit the "origin of new genes has always been an intriguing evolutionary question" (2011, p. e1002379). Some of the problems that occur when non-coding nucleotide strings are transformed into genes that specify a functional product include single genes that, although not as complex as an organ such as an eye, still require "a series of nontrivial requirements for functionality" (Siepel, 2009, p. 1693).

For example, in order for an orphan gene to encode a protein that serves a useful purpose requires "a promoter capable of initiating transcription, and presence in a region of open chromatin structure that permits transcription to occur. How could all of these pieces fall into place through the random processes of mutation, recombination, and neutral drift—or at least enough of these pieces to produce a protogene that was sufficiently useful for selection to take hold?" (Siepel, 2009, p. 1693). This question has forced many to rethink the question of the origin of new genes.

Siepel concluded that the origin of protein-coding genes ex-nihilo from random sequences of DNA "would seem highly improbable, almost like the elusive transmutation of lead into gold that was sought by medieval alchemists" (Siepel, 2009, p. 693). Wu et al., noted that the "de novo origin of a new protein-coding gene from non-coding DNA is considered to be a very rare occurrence in genomes" yet he has identified "60 new protein-coding genes that originated de novo on the human lineage since divergence from the chimpanzee" (Wu et al. 2011, p. e1002379). Orphan genes are now recognized to be common.

In contrast to Darwinian expectations, in order to explain orphan genes, evolutionists are forced to conclude that there exists a "growing appreciation of the oft-dismissed possibility of the evolution of new genes from scratch…" (Guerzoni and McLysaght, 2011, p. 2381). As genomic comparisons become ever more sophisticated as a result of the many major advances in sequence technology, evolutionists are forced to admit the unlikely scenario that is increasingly apparent that evolution from scratch must have often been the route to new genes throughout the history of life, and not evolution from existing genes (Doolittle, 2002, pp. 697-698). Evidence now exists that orphan genes constitute at least 30 percent or more of all genes in existing genomes (Palmieri, 2014, p. e01311). No doubt, the current rapidly progressing genetic research will uncover many more examples.

Thus, evidence now exists that a significant proportion of all functional genes did not emerge from other genes in the course of gradual evolution, but must have originated ex-nihilo (out of nothing), a finding that opposes Darwinism and supports the creation ex-nihilo view. These genes must have originated by some unknown de novo process (Wu, et al. 2011). Orphan genes are found in all life forms, from flies to humans (Palmieri, et al. 2014). Who knew that technical details could be so interesting? Indeed this issue definitely supports the creation worldview.

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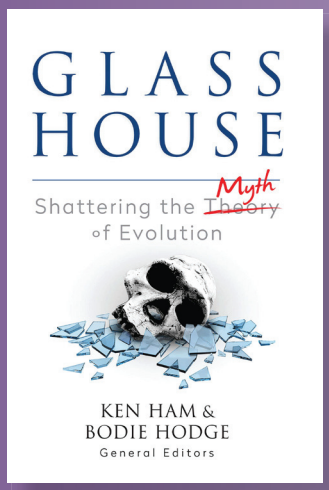

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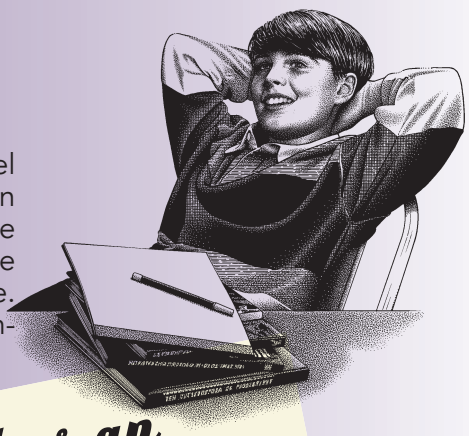
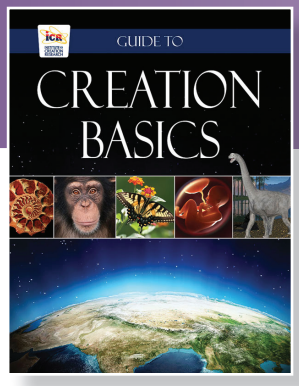
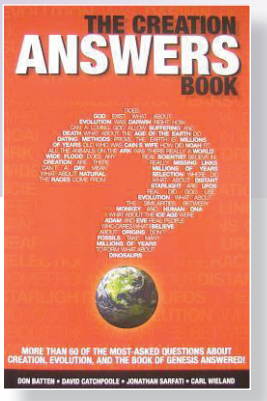


Think of doubt as an invitation to think!





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