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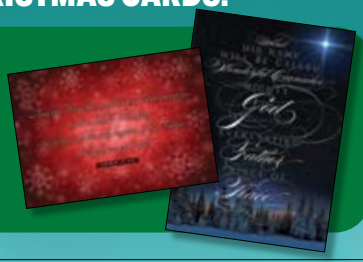

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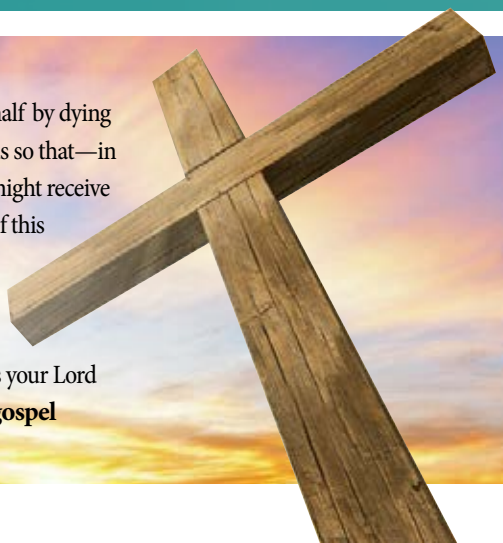

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DESIGNER
Dennis Davidson

[Jesus Christ] is the image of the invisible God, the firstborn over all creation. For by Him all things were created that are in heaven and that are on earth, visible and invisible, whether thrones or dominions or principalities or powers. All things were created through Him and for Him. And He is before all things, and in Him all things consist. And He is the head of the body, the church, who is the beginning, the firstborn from the dead, that in all things He may have the preeminence. For it pleased the Father that in Him all the fullness should dwell, and by Him to reconcile all things to Himself, by Him, whether things on earth or things in heaven, having made peace through the blood of His cross.
(Colossians 1:15–20)

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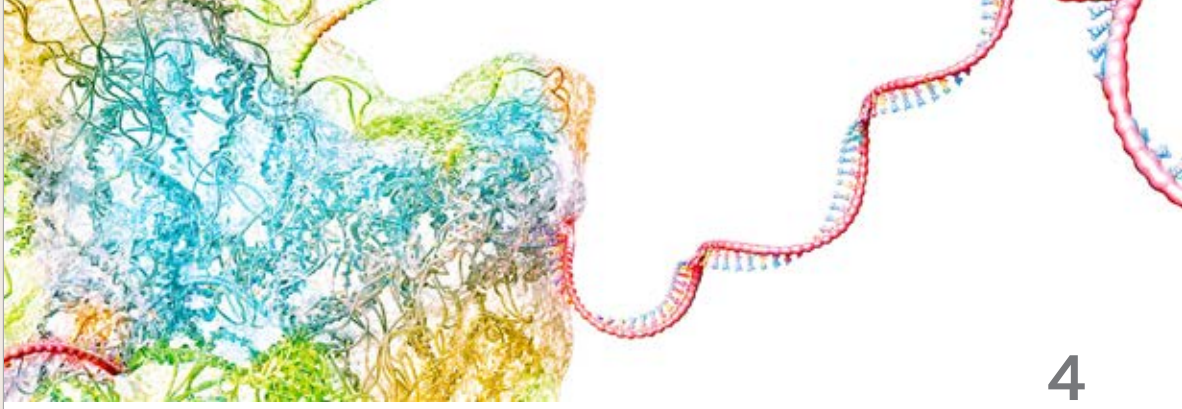

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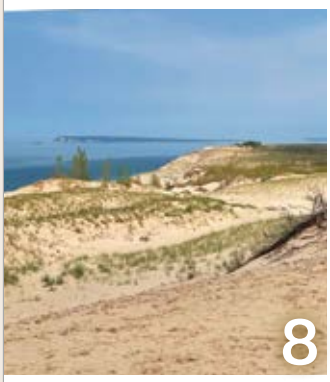

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Billions of Biological Nanomachines Point to Christ's Workmanship

RANDY J. GULIUZZA, P.E., M.D.

I'm sure we've all had at least one teacher who was particularly hard. I had two—my New Testament Greek professors at Moody Bible Institute, Mr. Donald L. Wise and Dr. Paul Haik. Greek class was notoriously "a killer" since each professor carried on the tradition of Moody's esteemed Greek scholar Dr. Kenneth S. Wuest. Yet, I'm thankful for how much I learned. It continues to help me.

A few years ago, I did a deep study of Romans 1:18-25 from the Greek. This passage is fundamental to the ministry of creation science, and in honor of Mr. Wise and Dr. Haik, I pulled every resource and studied each word in detail. Here's my expanded translation of verses 18 to 20, with 21 to follow.

> 18 God's wrath is revealed—undirected by earthly means—and is against [mankind's] lack of respect of God's position and irreverent disregard of Him, as well as the sinful behavior of mankind, who suppress the truth—an evil act in itself.
>
> 19 Because some things about God are certainly knowable [to them], since they are plainly recognizable by the appearance [of things all around them]; for God has made it undeniably evident to them.
>
> 20 For unseen things of God are knowable from His agency causing the totality of the natural realm, we call nature, to exist. In contemplating His workmanship of things, mankind, in fact, clearly sees so as to make deductions [about God's unseen attributes], namely, His unending inherent abilities and divine nature.[1]

Is the Lord Jesus' workmanship as *plainly* recognizable and *undeniable* as this passage says? Absolutely. The more we discover how the engineered workmanship in living creatures corresponds to the engineered workmanship of man-made things, the more we see Christ's power, genius, and wisdom. When someone credits nature for creating itself and fails to credit God as Creator, as millions do, they show a lack of respect for and an irreverent disregard of Him.

article highlights

- Scripture tells us that Christ's work is clearly evident in creation.
- Human engineering design reflects His design in creation.
- The cell is a factory of intricate nanomachines that are far too complex to have evolved.
- Many evolutionists suppress new discoveries because they don't want to admit creationists have a strong case.
- The fact that "billions of biological molecular machines operate in every living cell" is profound evidence of our Creator's handiwork.

The Undeniable Engineering of Molecular Machines

The mind-blowing complexity of living things plainly reveals God's agency as the maker of the biological realm. But we mustn't stop at complexity alone. As researchers carefully study creatures part by part, they find components performing functions that correspond precisely to human-engineered components doing similar things. A prior *Acts & Facts* article compiled a long list of these remarkably analogous components.[2]

Ribosome as part of a biological cell constructing a messenger RNA molecule

The fact that biological functions can be explained by engineering principles is important to *how* God reveals Himself generally to all of humanity, as Romans 1 says He does. Why? Well, general revelation wouldn't work if organisms' processes were alien to human design experience or human research couldn't decipher their operation.

In that case, one person could claim organisms were designed, but another could be equally convinced that they evolved their complexity via Darwinism's random-mutations and struggle-to-survive scenario. Or maybe it was magic, or space aliens, or something else. If biological functions were an enigma to us, then there'd be no way to determine whose claim is correct—which means that there'd be no general revelation about God.

Fortunately, God did *not* leave humanity clueless or needing an additional "key" to unlock biological secrets. God is free to design biological systems that operate through principles that totally contrast those of man-made designs—but He didn't. Research confirms He did just the opposite. Thus, a Christian can claim that creatures were undeniably engineered. How? By pointing to features of living things that 1) correlate to undeniably human-engineered things and 2) function by known engineering principles.

The correspondence of numerous features at the cellular level is plainly evident

even to evolutionary biologists. The journal *Cell* will be publishing a special issue titled "Molecular Machines in Cells: Natural, Semi-artificial, and Bioinspired Designs."[3] Dr. Vladimir Didenko of the Baylor College of Medicine, the guest editor, affirmed the tight correspondence between creatures and human engineering in his call for papers: "This rapidly developing and broad field includes the naturally occurring biological machines and the multitude of their fully artificial and semi-artificial analogs."[3] How might molecular machines compare to human-engineered devices? Didenko adds:

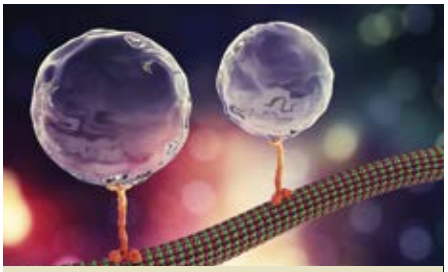
> Billions of biological molecular machines operate in every living cell. These macromolecular complexes perform critical tasks, such as protein folding, DNA replication, transcription, and transportation of various cargos….The best studied examples of natural biological machines include ribosomes, plasma membrane pumps, mitotic spindles, and motor proteins: myosin, kinesin, and dynein….This Special Issue is dedicated to natural molecular machines and their artificial and hybrid analogs which employ mechanisms borrowed from nature.[3]

In a 1998 *Cell* article, Bruce Alberts, the former president of the U.S. National Academy of Sciences, gave this telling description:

> The entire cell can be viewed as a factory that contains an elaborate network of interlocking assembly lines, each of which is composed of a set of large protein machines….Why do we call the large protein assemblies that underlie cell function protein *machines*? Precisely because, like machines invented by humans to deal efficiently with the macroscopic world, these protein assemblies contain highly coordinated moving parts.[4]

Fast-forward 21 years to researchers who send the same message.

> To a large extent, the living cell is a population of interacting molecular machines. These protein machines [act] as motors and pumps or [perform] operations with other biomolecules.[5]



Intracellular transport: kinesin motor proteins transport molecules moving across microtubules

Though the microscopic machines found in creatures share similar designs and underlying engineering principles with human-engineered machines, they're astonishingly complex, as these researchers attest.

> While belonging to the nanoscale, protein machines are so complex that tracing even a small fraction of their cycle requires weeks of calculations on supercomputers.[5]

Human-engineered machines are increasingly directed by computers via machine-specific languages. A Canadian university recently reported:

> Living organisms are made up of billions of nanomachines and nanostructures that communicate to create higher-order entities able to do many essential things, such as moving, thinking, surviving and reproducing.[6]

The principal investigator added:

> The key to life's emergence relies on the development of molecular languages—also called signalling mechanisms—which ensure that all molecules in living organisms are working together to achieve specific tasks.[6]

The biological languages they uncovered operate by the same principles as human-engineered control languages and can be reverse-engineered. These researchers discovered that "mathematical equations could well describe both languages" and could be used by humans "to design and engineer a programmable antibody sensor that allows the detection of antibodies over different ranges of concentration."[6]

Indeed, the workmanship of creatures is astounding. It's plainly recognizable in their features' functionality and complex engineering. The truth of Romans 1:18-20 is overwhelmingly confirmed by scientific discoveries. People living today are increasingly "without excuse" (1:20) when they deny their Creator.

Willful Truth Suppression by All Means Necessary

Romans 1:21 details the first avenue of how humans suppress truth.

> 21 Because having gained this insight through experience, they actively did not credit the Creator God as Creator or give thanks.

This verse describes a deliberate behavior. For decades, evolutionists suppressed creatures' obvious workmanship by developing a theory that was intrinsically anti-design. Their first tenet holds that genetic variation isn't purposeful but totally random. Second, they personify nature to "select" from this randomness in a clumsy way. Nobel Prize winner Francois Jacob summed up these anti-design characteristics of evolutionary theory perfectly.

> However, if one wanted to play with a comparison, one would have to say that natural selection does not work as an engineer works. It works like a tinkerer—a tinkerer who does not know exactly what he is going to produce.[7]

When this absurd story is taught as the truth, evolutionists know that many people won't believe that a perfect God would create nature like a mindless clod. Thus, anti-design explanations are inherently anti-theistic.

However, an avalanche of discoveries—such as incredible molecular machines and directed genetic changes that lead to purposeful adaptations[8]—is showing that Francois Jacob's account is as ludicrous as it's always sounded. These current findings are notably contrary to evolutionary theory. Thus, evolutionists are bitterly divided, and their theory is in crisis.

Still, the general public is kept in the dark. Why? Evolutionists suppress truth

for one overriding reason—to avoid aiding creationists or Intelligent Design (ID) advocates. Here's a small sample from their literature regarding why they self-censor their acid disunity.

> Too often, vital discussions descend into acrimony, with accusations of muddle or misrepresentation. Perhaps haunted by the spectre of intelligent design, evolutionary biologists wish to show a united front to those hostile to science.[9]

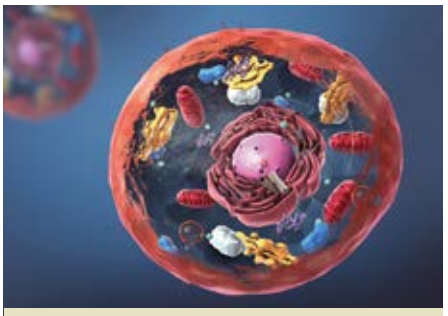
> Indeed, I have chastised more than once some of my more, shall we say, enthusiastic, colleagues…[when criticizing evolutionary theory] for unwittingly creating a backlash among "conservatives"….It is definitely the case that evolutionary biologists are worried by the specter of ID.[10]

> [Regarding why current evolutionary theory is tolerated] the dominant political concern was a fear of attack from fundamentalists….In the past couple of decades, everyone has become keenly aware of this, regardless of their satisfaction or otherwise with the modern synthesis. "You always feel like you're trying to cover your rear," says [Alan] Love. "If you criticize, it's like handing ammunition to these folks." So don't criticize in a grandstanding way, says [Jerry] Coyne, [which only]…plays into creationists' hands.[11]

The dispute grows intense over the words evolutionists are allowed to use for describing molecular "machines." Some evolutionists want to say "machine" when they see something that has the characteristics of a machine. Other evolutionists are aghast and want to change the definition of machine or, better yet, ban the word altogether. Why? Because in all of human experience, machines are only engineered by intelligent agents, which raises the "specter" of Intelligent Design.

A pair of evolutionists favoring the ban on "machine" explain:

> The use of such machine metaphors to describe aspects of molecular structure and function are commonplace in the scientific literature….Machine metaphors have also been heavily used by proponents of Intelligent Design (ID) in their arguments against evolutionary theory.[12]



Components of eukaryotic cell: nucleus, organelles, and plasma membrane

Additional ban backers say:

> In textbooks, science educators have presented the comparison of living organisms and man-made machines not just as a superficial analogy, but carrying it out to a *considerable level of detail*….Creationists and their modern heirs of the Intelligent Design movement have been eager to exploit mechanical metaphors for their own purposes….For ID proponents, of course, these are not metaphors at all, but literal descriptions of the living world, arching back to Newton's conception of the Universe as a clock-like device made by the Creator. The very fact that scientists rely on mechanical analogies *to make sense of living systems*, *while disclaiming any literal interpretation*, strengthens creationists in their misconception that scientists *are "blinded" by a naturalistic prejudice*.[13]

The pulpit pounding reaches a near-frenzied level that's proportional to the extent of self-delusion here.

> At the same time, however, we have to realize that viewing complex macromolecular assemblies as 'machines' is entirely inappropriate….Rather, we are convinced that they are the products of aeons of evolutionary processes. Francois Jacob made this clear almost 30 years ago: nature is not an engineer; she is a tinkerer. Molecular machines, although it often may seem so, are not made with a blueprint at hand…. The apparent similarities of creations by engineers and tinkerers raise a fundamental scientific challenge: understanding the laws of nature that unite evolved and designed systems. Or in other words: understanding the work of a tinkerer not only by using equipment designed by engineers…but also by searching for the blueprint. 'Nothing in biology makes sense except in the light of evolution': we know that Dobzhansky (1973) must be right. But our mind, despite being a product of tinkering, itself strangely wants us to think like engineers.[14]

My Greek teachers Mr. Wise and Dr. Haik likely never read evolutionary scientific literature, but their beloved Greek text in Romans 1 portrays these evolutionists perfectly. And like the apostle Paul, these men would have added, "Professing themselves to be wise, they became fools" (Romans 1:22).

In reality, molecular machines are the undeniable revelation of Christ's power, genius, and wisdom.

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Dr. Guliuzza is President of the Institute for Creation Research. He earned his Doctor of Medicine from the University of Minnesota, his Master of Public Health from Harvard University, and served in the U.S. Air Force as 28th Bomb Wing Flight Surgeon and Chief of Aerospace Medicine. Dr. Guliuzza is also a registered Professional Engineer and holds a B.A. in theology from Moody Bible Institute.

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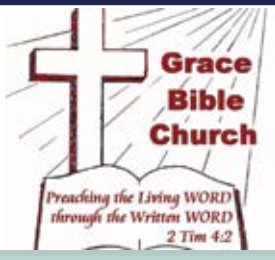

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park series

SLEEPING BEAR DUNES NATIONAL LAKESHORE
SHOWCASE FOR THE ICE AGE

TIM CLAREY, PH.D.

Like a white winding ribbon along the shoreline, Sleeping Bear Dunes National Lakeshore's sandy bluffs ascend hundreds of feet above the waters of Lake Michigan. This steep dune face defines the northwestern coastline of Michigan's Lower Peninsula for over 60 miles, making it the longest freshwater dune system in the world.[1]

Encompassing 50,000 acres, several inland lakes, and two offshore islands,[2] the park is famous for its 284-foot Dune Climb. Travelers from across the world have marveled at these dunes since the park's induction into the National Park System in 1970.

Once voted the "Most Beautiful Place in America" by *Good Morning America*'s viewers,[2] the park's terrain was sculpted by a combination of glacial ice, water currents, wind, and a rising land surface. These processes began during the post-Flood Ice Age and continue today, leaving their respective fingerprints on Sleeping Bear Dunes National Lakeshore. But how do we know there was an Ice Age? A visit to the park and the surrounding area provides several observations that are best explained by thick ice sheets.

Ice Age Evidence Abounds

The Ice Age began soon after the Flood and likely lasted for about 500 to 700 years.[3] Evidence indicates this was the only Ice Age in Earth's history.[3] Scars in bedrock and piles of unsorted rock, sand, and clay all show that massive ice sheets once extended across the Great Lakes region. Even Michigan's state rock, the Petoskey stone, can be found in the glacial sediments within the park. Petoskey stones are fossil corals that were plucked by glaciers from the Flood layers just to the north and transported south by the moving ice sheets.

Dune Climb, a 284-foot sand dune
Image credit: Tim Clarey

article highlights

- Michigan's Sleeping Bear Dunes National Lakeshore features an abundance of outstanding natural features.
- The park's scattered rocks, glacial moraines, and drumlins show evidence of the Ice Age.
- Ice Age glaciers carved out much of the Great Lakes, scouring the land and transporting debris across the Sleeping Bear Dunes region.
- Michigan's sculpted landscape reminds us of God's handiwork and the historical accuracy of Genesis.

View of the 450-foot-high Sleeping Bear Dunes with Lake Michigan at the base

Image credit: Tim Clarey

Petoskey stone, an early Flood fossil coral

Other observations include out-of-place rocks, like igneous and metamorphic rocks, that were carried by ice from distant locations. These rocks are known as glacial erratics, left behind by the ice sheets as they melted. Petoskey stones are glacial erratics, too.

Another clue that glaciers once covered this landscape is the presence of long, linear hills of unsorted material known as moraines. Moraines form when glaciers melt as fast as they advance, sometimes depositing ridges of debris several hundred feet high. During the Ice Age, the ice sheets left behind a thick blanket of loose sediment called drift across much of Michigan's Lower Peninsula, including Sleeping Bear Dunes National Lakeshore. Drift is the general name for much of the clay, sand, and rocks transported within the ice.

Author posing by a glacial erratic, a rock out of place from its original location because it was transported in glacial ice
Image credit: Reneé Clarey

Drumlins are other glacial landforms we can observe near Sleeping Bear Dunes. These half-mile-long hills of glacial drift are elongated in the direction of glacial flow and are often found in swarms. Exactly how they form is still unclear, but some of them are located just east of the park. They tell us the ice moved from north to south in this area.

A drumlin on the Leelanau Peninsula. The direction of glacial movement was from left to right, or north to south in this area.
Image credit: Tim Clarey

Sleeping Bear Dunes is situated near the base of the Leelanau Peninsula, a triangular piece of land that juts about 25 miles north from the park, essentially forming the little finger of Michigan's "mitten." The ice in this region flowed due south, scouring out deep troughs in the fresh Flood sediment and leaving a jagged coastline with many peninsulas. Post-Ice Age wind and water currents transported sand across several of these bays, smoothing the shoreline and sealing off smaller lakes from Lake Michigan, such as Glen Lake and North Bar Lake.

North Bar Lake
Image credit: Tim Clarey

In the northern Great Lakes, the land rebounded hundreds of feet after the Ice Age as the weight of the ice sheet was relieved, causing the ground to rise. Many places in northern Michigan show wave-carved terraces at 50 feet or higher above modern lake levels, attesting to this uplift.[4]

Similar lake terraces have also been described on Mackinac Island, Michigan, located 85 miles to the northeast.[5] About 175 feet of rebound is noted for the Sleeping Bear area, with much more rebound farther to the north.[4] These observations and others indicate a thick continental glacier covered the Sleeping Bear Dunes region about 4,000 years ago.[3]

Two Types of Dunes

Sleeping Bear Dunes has both beach dunes and perched dunes.[6] Beach dunes form just past the shore from windblown sand. These are common on beaches around the world. But Sleeping Bear Dunes is unique because it also has perched dunes. These are located on a glacial moraine that intersects the coastline of the park. They form as wind winnows sand from the bottom of the moraine and deposits it on top. Some of the park's moraines rise 450 feet above Lake Michigan, significantly elevating these dunes. Glacial rebound also contributed to their present height.

Perched dunes on the top of a glacial moraine
Image credit: Tim Clarey

Connection to the Global Flood

What caused the Ice Age? Conventional scientists claim it was generated by coinciding shifts in Earth's tilt, orbit, and wobble over millions of years. However, the dozens of theorized combinations of these minor factors have all failed to account for the major ice sheets.[7]

Creation scientists have developed a better model that demonstrates how the Ice Age was triggered by the effects of the global Flood. The acronym HEAT helps us remember this model.[7]

1) Hot oceans. Rapid tectonic plate movement during the Flood created a hot new seafloor, heating the oceans.
2) Evaporation. Warmer oceans prompted more precipitation to fall on Earth, building up ice sheets.
3) Aerosols. The runaway subduction of old ocean crust also triggered extensive volcanic activity that spewed ash called aerosols. These blocked sunlight, cooling the earth and causing surface temperatures to drop.
4) Time. The cooling of the ocean took time, and continuous eruptions supplied aerosols that kept ice from melting even in the summers.

These ice sheets carved out much of the topography of the Great Lakes and scoured the land, transporting debris across the Sleeping Bear Dunes region and depositing moraines, drumlins, and erratics.

God's Handiwork

God had a plan all along. As the Flood ended, an Ice Age began. Ice buildup lowered the sea level at just the right time to expose land bridges. As a result, animals and humans were able to migrate from the Ark to distant continents soon after the Flood. Once the oceans cooled sufficiently and the volcanic activity began to wane, the ice sheets melted and rising ocean waters covered the land bridges.

Today, Sleeping Bear Dunes National Lakeshore's beautiful freshwater lakes and sandy beaches are enjoyed by tourists from around the globe. However, it's also a striking reminder of the historical accuracy of Genesis. Evidence abounds for a global flood.[3] The post-Flood Ice Age sculpted and formed Michigan's landscape, reminding us of God's handiwork.

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BRIAN THOMAS, PH.D.

Trait Variations—
Engineered Alleles, Yes! Random Mutations, No!

Our world is dynamic, offering changes and challenges to its living residents. Plant and animal trait variations can help them adapt to certain settings. Some adapt quickly as they pioneer new niches, developing traits to fit the environmental conditions. How does this happen?

Two 19th-century pioneers investigated this question. Charles Darwin (1809–1882) observed pigeons (*Columba livia*).[1] He noticed that certain hybrids suddenly displayed feather patterns or other traits that neither parent breed had shown. Gregor Mendel (1822–1884) saw certain traits suddenly appear in pea plants (*Pisum sativum*) that he studied for eight years. Where did the new variations come from? Mendel and Darwin gave different answers.

Darwin Versus Mendel in the Trait Variation Question

Darwin recognized the role of human breeders who select individual animals for certain traits. He wrote, "The key is man's power of accumulative selection: nature gives successive variations; man adds them up in certain directions useful to him."[2] He then imagined nature doing an even better job than humans of producing endless trait varieties.

But how did he determine that man's selective power—not a creature's innate capability—is "the key" to trait variation? He just chose to believe it.[3] And thus, Darwin's concept of natural selection became the prime mover of today's molecules-to-man evolutionary story.

White pea flower

Mendel observed that flower petal colors appeared in hybrid plants that were different colors from the parent plants. He tabulated hundreds of results from specific plant traits that switched on or off. For example, wrinkly versus smooth peas in the pods occurred in 1:3 ratios in the third generation.

Mendel noted that if inherited characteristics came in two versions, which we now call alleles, they would explain the results.[4] Independent sorting of alleles into sperm and egg cells would produce the ratios he tabulated.

article highlights

- An allele is an inbuilt, heritable coding instruction that specifies at least two versions of a trait.
- Creatures can adapt when alleles are mixed and matched across generations. Inbreeding plus isolation removes alleles from a population as speciation occurs.
- Charles Darwin credited the trait changes that accompany speciation to an external "selection" process instead of to internal alleles.
- Gregor Mendel, the father of genetics, saw no evidence of Darwin's predicted transitional forms in the results of his breeding experiments. Instead, he saw variation within kinds.
- Jesus Christ placed profound genetic ability into each creature so it could self-adjust, thrive, and fill the earth with marvelous variety.

Engineered Alleles

Mendel located the source of variation within, not without, living creatures. He wrote, "The number of the components, as is known, increases with the number of the differentiating characters in cubic ratio."[5] We can call this Mendel's Law of Exponential Trait Combinations.[6] All the Lord Jesus had to do to ensure enormous potential for differentiation within each created kind was to embed alleles into the first male and female of each creature.

Number of alleles	Number of traits
2	4
3	8
9	512
20	1,000,000

Mendel discovered an actual key to speciation. It begins with meiosis where half of a parent's DNA gets transferred to an egg or sperm cell. Inbred generations inherit identical alleles because they are descendants of the same set of alleles. This causes a loss of heterozygosity. Heterozygotes have more alleles to distribute to further generations than do homozygotes.

Speciation is spurred when the new combination of alleles from each parent in the offspring becomes reproductively isolated from the parents' population. This happens in many ways, such as moving away from the parents, showing mating behaviors that differ from those of the parents, or even deploying alleles for incompatibility proteins that keep sperm from docking with eggs.

Indeed, researchers found a "deep-seated common genetic basis to reproductive isolation among very different organisms," tomatoes and fruit flies.[7] It looks like the Lord preprogrammed reproductive isolation in creatures to encourage their divergence—one way to make sure they would multiply and "fill the earth" (Genesis 1:22).

Once the new population breeds only with its own members, its particular trait combination stabilizes into a new species that now pioneers a new niche. In sum,

1. Meiosis → Heterozygosity lost
2. Reproductive isolation → Speciation

When formerly isolated species come back together, or hybridize, then even long-separated alleles recombine to restore heterozygosity. The offspring can immediately look and act more like the original parents.

3. Hybridization → Heterozygosity regained

Mendel wrote, via an English translation, "*Transitional forms were not observed in any experiment*."[8] He saw discrete trait variations that switched off or on in predictable ratios, not traits in some succession of endless morphing. In short, he saw engineered biology.

Alleles, not Mutations

Mendel stated, "Nothing justifies the assumption that the tendency to the formation of varieties is so extraordinarily increased that the species speedily lose all stability, and their offspring diverge into an endless series of extremely variable forms."[9] In short, Mendel's pea plants disobeyed Darwinism and stubbornly remained pea plants.

So, along came Neo-Darwinism to save the evolutionary story. This construct added mutations (Neo) to selection (Darwinism). Nature, the substitute designer in Darwin's plan, would now select mutants as the precursors of new life forms.

But the Law of Exponential Trait Combinations has something

Friesian horse

to say about mutations. Imagine God made a creature with one billion DNA bases in its total genome.[10] Let's say He engineered only 500 alleles and that each allele occupied one DNA base—although it's more complicated in reality, as explained below. In the beginning, God placed allelic differences at just those sites that would generate adaptive or ornamental, not fundamental, trait differences. The potential for trait variations or phenotypes in eventual offspring from 500 alleles becomes practically limitless…with zero random mutations needed!

Do random mistakes occur? Of course. Mistakes happen in today's sin-cursed universe.[11] New research even suggests that creatures corral other genetic changes into certain genetic zones, suggesting that the Divine Engineer accounted for even them. However, if created alleles are a means of adaptation, random mutations are not necessary for variation.

Mendel wrote that "the species possesses the capacity of fitting itself to its new environment."[12] Does modern research still side with such internalism?

Alleles in Action

Adaptive radiations (ARs) fascinate biologists. These occur when a founder population[13] quickly diversifies into species (variously called morphs or subspecies) that inhabit new niches. Two AR examples show that encoded genetic information, not random mutation or selection, drives speciation.

A stunning array of cichlid fishes have diversified in African lakes. The three largest lakes (Malawi, Tanganyika, and Victoria) contain in the same water cichlids that are well-adapted to eating plankton, others that scrape algae off rocks, some that are suited to crush snails for food, some that nibble other fishes' scales, and still others with big lips that eat insects.

Neo-Darwinism has each of these forms emerging through slowly accumulated random mutations. Accordingly, cichlids should have evolved those morphs first, each of which then colonized the lakes. Thus, the insect-eaters from all three lakes should have more similar genetics to one another than to the other cichlids in that lake. But recent studies have shown the opposite.

Stunningly similar African cichlid variations unfolded multiple times, often from sorted alleles already in a founder population, to inhabit different lakes.

It turns out that even closely related cichlids already have many differences across their genomes. They retain "duplicate genes" that "exhibit new expression patterns." Some of the genes code for microRNAs that "stabilize and refine expression patterns."[14] Inbuilt mechanisms of diversification also include transposable element insertions[15] and the recruitment of "old alleles from standing variation."[16] Thus, not only does it appear that the Lord Jesus front-loaded these fish with alleles to tweak traits each time a founder population pioneers a new lake, but some alleles even stabilize those traits into new species. No random mutation or selection is needed—just engineered cichlid genomes.

Darwin's famous finches, *Geospiza fortis*, offer another example. These birds had branched into a dozen species by the time Darwin visited them on the Galapagos Islands in 1835. *Geospiza* species, now reclassified as tanagers instead of finches, can differ in plumage and beak shape across the Galapagos Islands that they inhabit.

Do their genetics point to the selection of random mutations as the way these birds diversified? Not according to genome analyses. *Geospiza* genome sequencing found that "extensive sharing of genetic variation among populations was evident, particularly among ground and tree finches, with almost no fixed differences between species in each group."[17] Where did this genetic variation come from?

Researchers screened genomes of representative *Geospiza* birds with both blunt and pointed beaks. They concluded that "hybridization…has influenced the evolution of a key phenotypic trait: beak

Image credit: putneymark

Image credit: Sharp Photography

Finches on the Galapagos Islands diversified through Mendelian speciation, not mutation-selection.

Top: Male Geospiza fortis *from Santa Cruz Island*

Below: Female Geospiza fortis *from Fernandina Island*

shape."[17] The team identified two distinct variants of a gene named *ALX1* that helps control beak shape.

One year later, another team sequenced DNA from six *Geospiza* species to learn that another gene region called *HMGA2* controls beak size.[18] Evolutionary biologist Dolph Schluter told *Nature News*, "We can point to a physical, material basis for that change."[19] Quite unlike mystical Neo-Darwinian concepts, the material basis for trait adjustment was already built into these birds, just as it was in Mendel's peas.

Time after time, researchers look for accumulated random mutations that they'll expect, but they keep finding instead that preexisting alleles play the prominent role in generating variations. When blind Mexican tetra (*Astyanax mexicanus*) crossbreed with sighted individuals, a range of eye sizes suddenly appears. A tribe of plants called silverswords greatly diversified as they colonized Hawaii. Some grow tall with woody trunks, while others have fleshy stems that stay near the ground, yet they all hybridize.

And remember those pigeons? Recent results showed that sorting alleles drives their plumage diversity.[20] Darwin was wrong, after all.

Engineered Biology

One recent report reviewed ARs. Its authors wrote:

> It is well possible that increased efforts along this line of investigation will still fail to uncover general genomic features, and that the determinants of organismal diversification need to be explored otherwise.[21]

Where else should they look if not to "general genomic features" like mutations? Perhaps they should further explore their observation that "the genomes of these species contain *adaptive allelic variants* that originated long before the actual species or populations have formed."[22] How long before? Try the beginning of creation.

What has the last century revealed about adaptations? First, random mutations do very little for adaptation, and none are needed. Second, alleles most often consist of networks made of genes, regulatory elements, and other linked features. We have also learned that many adaptations arise from mixing and matching alleles already within creatures, not from factors outside of them.

To Biology and Beyond!

Those who regularly read *Acts & Facts* should be familiar with continuous environmental tracking (CET), ICR's engineering-based biological model of adaptation.[23] CET discussions have pointed to an array of adaptive mechanisms—including transposable elements, mutational hotspots, post-transcriptional editing, epigenetic mechanisms, etc.—that creatures use to track their surroundings, process those data inputs, and deploy suitable trait adjustments even in later generations.

How does this fit with the conclusion that "rapidly- and extensively-diversifying lineages seem to be those having access to a pool of alleles useful for the adaptation to novel ecological niches"?[21] We suggest that the Lord integrated this "pool of alleles" with CET-related mechanisms in each of His creatures.

For that matter, a creature's environmental tracking processes could influence allele sorting during meiosis—all by design. We already see evidence of "composite elements combining multiple coding and regulatory variants at several individual genes" and that these reveal a "daunting complexity underlying adaptive divergence."[21]

Clues that suggest creatures were engineered to adapt include the repeatability of trait deployment, suitability of trait variations to specific ecologies, the rapidity of trait adjustments, predictability of traits based on allele sorting, and a pool of alleles for adaptive or ornamental rather than fundamental traits. The Lord built a brilliant system that maximizes potential for phenotypic diversity while minimizing genetic storage space. Zero random mutations and external selections are required to generate plenty of variants from each created kind.

It appears that our Lord wanted variety in His creatures, so He gave them diversity generators from the beginning.

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Bacterial Flagella

Molecular Motors Show Masterful Design

BRIAN THOMAS, PH.D., AND DAVID THOMAS

The bacteria alive in our guts swim using tiny engines that power propellers called flagella (Figure 1). Each of several flagella—the number depends on the kind of bacteria—spins like a whipcord. These bacteria can even change the rotation direction of certain flagella to reposition themselves before heading in a new direction.

Now these are mighty miniscule motors! How well do they work? How are they controlled? New research has supplied stunning, unforeseen details that point more clearly than ever to a precision engineer to explain how these nanoscopic machines came into being.

Figure 1. *Bacterium (cyan) with flagella (yellow)*

Engine Parts

Bacterial flagella are made of tightly fitted parts, including bushings and gears. Though they vary in design between species, each motile or swimming bacterium has all the required engine parts (Figure 2). Key parts of flagella include:

1. *Gear box*: made of a large central gear with one or more smaller gears that surround it. A voltage (and chemical potential) across the bacteria's cytoplasmic membrane powers these smaller gears, making them little electrochemical motors in themselves. The central gear is called the C-ring, and the smaller gears are usually called stator complexes. Stator is an electrical engineering term referring to the stationary part of an electric motor.
2. *Structural scaffold*: made of multiple rings, disks, and cage-like structures that stabilize the flagellar motors—especially the stator complexes. The design varies between species.
3. *Central hub* (typically called the MS-ring): connects the central gear to the driveshaft.
4. *Driveshaft* (sometimes called the rod): transmits torque (rotational force) from the central hub to a universal joint outside the cell.
5. *Bushing*: a type of bearing that creates a watertight seal around the driveshaft while stabilizing its rotation.
6. *Universal joint* (often called the hook because of its shape): changes the rotation axis of the flagella and transmits torque from the motor to the propeller filament.
7. *Helical filament*: a propeller.
8. *Export gate and assembly motor* (positioned inside the flagellar motors): sort out proteins and export them to the appropriate assembly sites at the required times to construct each flagellum.
9. *Navigation system:* While not part of bacterial flagella, this is crucial for bacteria to avoid harmful conditions and find food. Bacterial navigation systems integrate many components, including sensors that detect environmental conditions and algorithms to interpret sensory inputs and activate appropriate flagellar switches.

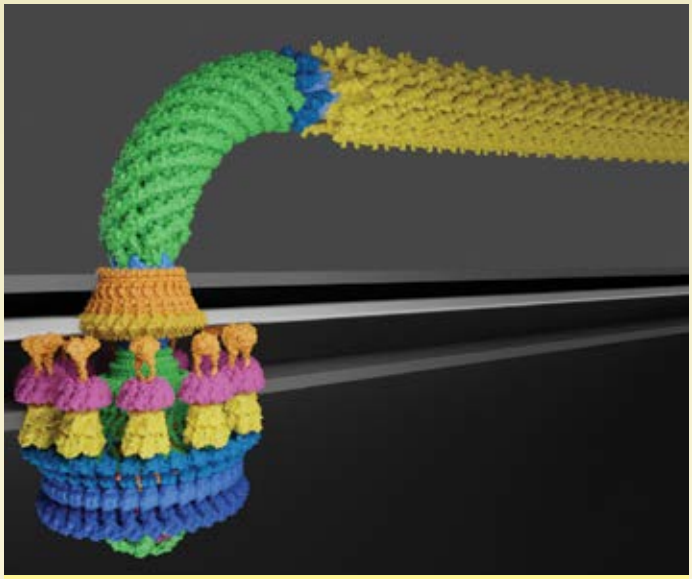
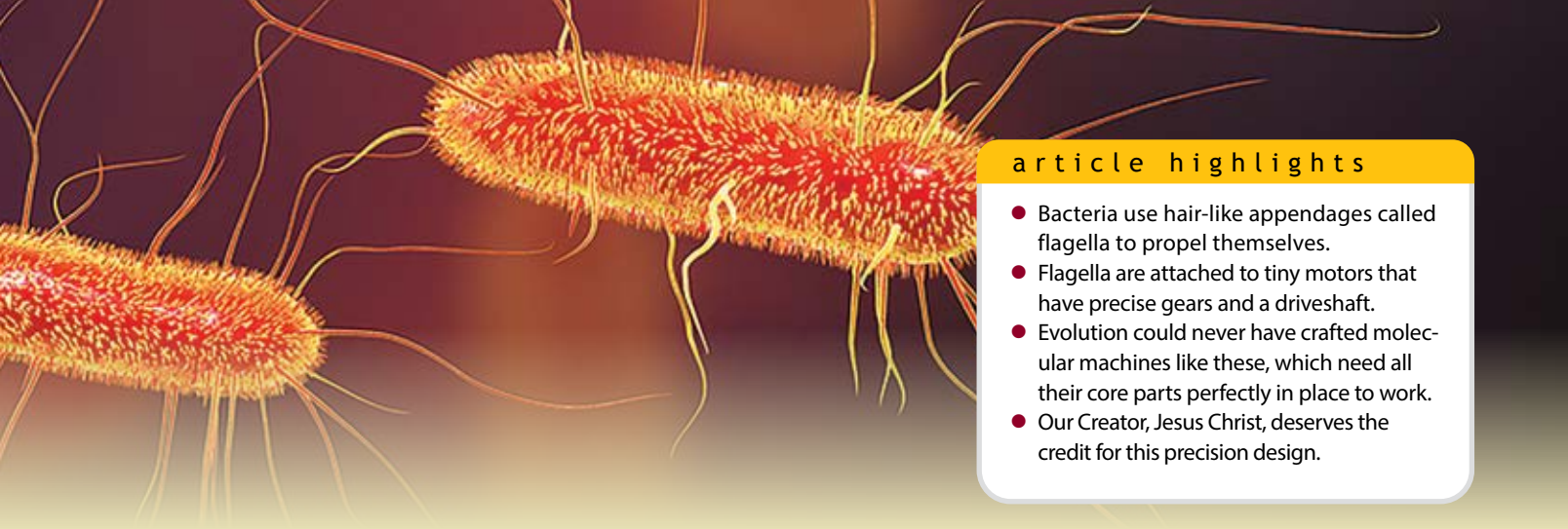


Figure 2. *An illustration of a fully assembled* E. coli *flagellum created by David Thomas using the Molecular Nodes Add-on in Blender. Protein structures are sourced from the RCSB Protein Data Bank*[1] *and the AlphaFold Database.*[2]

The Gear Box

Keiichi Namba, a molecular engineer at Osaka University, said that the flagella gear box is "just like a two-cogwheel gear system."[3] Figure 3 shows 11 stator complexes in yellow, also called powered gears, per flagellum. They always rotate clockwise when



article highlights

- Bacteria use hair-like appendages called flagella to propel themselves.
- Flagella are attached to tiny motors that have precise gears and a driveshaft.
- Evolution could never have crafted molecular machines like these, which need all their core parts perfectly in place to work.
- Our Creator, Jesus Christ, deserves the credit for this precision design.

viewed from outside the cell. In forward mode, the central gear (blue ring in Figure 3) lines up with the inner side of the ring of stator complexes. In this position, the central gear rotates the flagellum counterclockwise.

What about spinning in reverse? Signaling proteins from the navigation system bind to the outside of the central gear. This tilts the central gear outward to enlarge its diameter (Figure 3). The central gear then engages with the outer side of the stator complexes so that the central gear and the rest of the flagellum rotate clockwise (reverse). After a set amount of time, a component of the navigation system can then remove the reverse signal from the motor to switch the central gear back into forward.

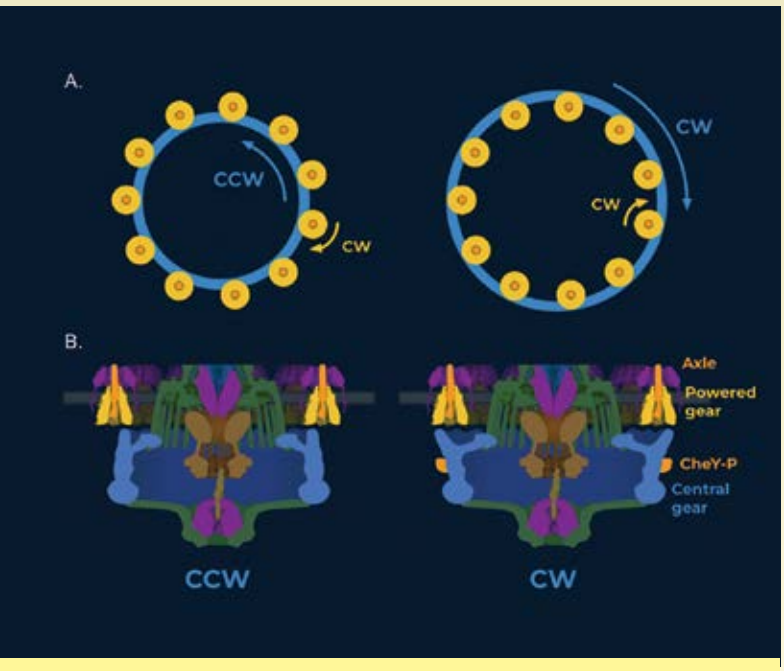


Figure 3. *Forward and reverse gears. (A) Diagram of the flagellar gear box, viewed from above, showing the central gear in blue, smaller gears in yellow, and the axle of the smaller gears in orange. The central gear is rotating counterclockwise (CCW) on the left and clockwise (CW) on the right. The powered gears always rotate CW. (B) Internal view of the motor, colored as in A. Binding of CheY-P to the central gear induces the conformational change that increases the diameter of the top of the central gear.*[4]

How does the rotation of the smaller gears drive the rotation of the central gear? The central gear has a set of knobs. The stator complexes have five knobs each, shaped like gear teeth. Both sets of knobs precisely align. As far as we know, these gear teeth do not touch each other like man-made gears do. Instead, electrical charges at specific positions on the teeth exert force at a distance.

This is analogous to man-made contactless (nearly frictionless) gears with magnets in the teeth that push on one another. As one technical paper put it, "Highly conserved charged and neighboring residues [amino acids] of the A subunit [gear protein] interacts with the rotor, generating torque through a gear-like mechanism."[5] For a detailed discussion of other design features of the flagellum gearbox as well as the design features of other flagellum parts, see David Thomas' upcoming review.[6]

How Did This Get Here?

Famous evolution defender J. B. S. Haldane once said that evolution by natural selection could never craft "various mechanisms, such as the wheel and magnet, which would be useless till fairly perfect."[7] If he was right, then evolution flounders on just one bacterial flagellum with its wheels and electrostatic gears.

Bacterial flagella are truly spectacular molecular machines. Their precise detail and sophistication require a Master Designer just like the God of the Bible.

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They had tails like scorpions,
and there were stings in their tails.
Their power was to hurt men five months.

— Revelation 9:10 —

***Chelicerata, Scorpiones,* Centruroides sp.**

Image credit: Micrograph captured and edited by Michael J. Boyle, Ph.D., The William B. Dean, MD Imaging Center of the Institute for Creation Research

The Myth of Darwinian Plasticity

Among the mechanisms promoted to account for the process of evolution, plasticity is one of the most prominent. This term broadly refers to a capacity for being shaped, altered, or deformed in one or more directions. Within biology, plasticity is primarily used to describe the adaptability of an organism to an external environment. One of the most recognized authorities on this topic proposes that "mechanisms of plasticity include some of the most ingenious and widely conserved creations of nature."[1] Is nature really an ingenious creator with mythical powers?

To understand such mechanisms, we must first define a set of terms in the context of biology. Genotype: the genetic composition of heritable DNA and RNA in an organism or population of organisms. Phenotype: the observable physical and behavioral traits of a cell or an organism. Response: the changes in activity or behavior patterns of an organism as the result of a stimulus. Environment: the combination of chemical, physical, biological, and climatic conditions that surround an organism at any particular time.

All four terms collectively define the Darwinian mechanism of phenotypic plasticity, "the ability of a single genotype to produce multiple phenotypes in response to variation in the environment."[2] Thus, evolutionists teach that phenotypic plasticity is essentially an environmentally responsive trait that evolves.[1,3] Therefore, plasticity is a trait that produces multiple plastic traits by means of natural selection, the core tenet of evolution. And the plasticity of this plastic mechanism apparently operates through active or passive, adaptive or nonadaptive, and reversible or irreversible responses by any multicellular organism on Earth.[1] Are you confused yet?

Importantly, plasticity is predicted to act primarily during development, when a tightly regulated progression of order and complexity builds every plant and animal. During early development, molecules, cells, and embryos are exposed to different environments, providing plasticity with a broad flexibility of choices.[1,4,5] Environmental inputs during development are also thought to directly shape the responses of organisms and bypass the genome, providing novel morphological traits for natural selection that may,[5] or may not,[6] be independent of genetics. This is developmental plasticity, a synonym of phenotypic plasticity.[1]

Clearly, the most "plastic" components of Darwinian plasticity are the Darwinists themselves, not the organisms. They propose a seemingly open-ended mechanism with unlimited flexibility over millions of years to account for the adaptability and diversification of organisms—each assumed to be a highly complex, specialized creation of nature. Evolutionarily speaking, "plasticity must have been an early universal property of living things."[1]

ICR's model of continuous environmental tracking (CET) operates in direct opposition to Darwinian plasticity. Where evolutionists propose that organisms ultimately diversify at the whim of environmental influence, we envision organism-centered adjustments to changing environmental conditions. Thus, we predict that organisms are the agents in control of each adaptive response. They are not molded by inanimate impulses of nature; they determine which elements of the environment are stimuli. Life adapts by integrating molecular, biochemical, cellular, and physiological traits of the whole organism, by the whole organism.

What evolutionists promote as a plastic, unguided, anything-is-possible mechanism to account for the biodiversity of life on this planet we know to be intentional, purposeful, and directed preparations by and through our Creator, Jesus. As for the false promotion of a mythical evolutionary mechanism being "an early universal property of living things,"[1] we stand upon Scripture, which tells us not only who but also when He created the heavens, the earth, the sea, and every form of life. "Forever, O Lord, Your word is settled in heaven" (Psalm 119:89).

article highlights

- Evolutionists boldly promote an ambiguous environment-centered mechanism of plasticity to account for the origin and diversification of every life form on Earth.
- Our Creator designed every creature with an explicit organism-centered mechanism of adaptability, enabling them to thrive within changing environments.
- The tremendous biodiversity on this planet displays the brilliant engineering of the Lord Jesus, rendering the false god of nature as forever blind and impotent.

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CHARLES (CHAS) C. MORSE, D.MIN.

This Very Purpose

The apostle Paul's letter to the Colossian church was fundamental for its recipients. Evolutionary ideologies thrived in the city of Colossae, including Epicureanism, Stoicism, and Gnosticism. Each of these erroneous worldviews denied the Creator God, Jesus Christ.

As a prisoner, how could Paul deliver this critical warning letter? The 1,300-mile journey from Rome to Colossae was fraught with many perils and hardships. Paul needed a trusted aid. The one he chose for this important task was Tychicus, described as a "beloved brother, faithful minister, and fellow servant in the Lord" (Colossians 4:7-8).

Eileen and Ed Gross with Big Blue

Tychicus is mentioned five times in the New Testament—four by Paul and once by Luke. He traveled from Troas as part of Paul's third missionary journey (Acts 20:4-6). In one of Paul's final letters before his martyrdom, he recorded that he dispatched Tychicus to Ephesus (2 Timothy 4:12). Tychicus was no mere courier but a valued colleague and friend who knew Paul and his ministry intimately. Paul trusted Tychicus to encourage the believers with the knowledge that would help them grow in Christian maturity, sound doctrine, and spiritual discernment.

In many ways, Tychicus' attributes were reflected by the service of one faithful couple, Ed and Eileen Gross. It all began when Jesus grabbed their hearts. "Something was stirring in our lives," Ed said. "And one Valentine's night, we were watching TV. There was some speaker on a program that said, 'I feel really sorry for [those who] are trying to get to heaven by being good.' That was a key phrase that was like a light coming on. We got down on our knees in the living room in 1972 and accepted the Lord Jesus Christ as our Savior. Intercessory prayer works. Don't ever give up on intercessory prayer."

From that point forward, Ed and Eileen began studying God's Word on their own. "We had never read the Bible up to that point, so it became alive to us." As their love for Scripture grew, so did their interest in biblical creation. Eileen began listening to a radio program by the Institute for Creation Research's Drs. Henry Morris and Duane Gish. The Grosses subscribed to ICR publications, including *Acts & Facts* and *Days of Praise*.

In 1995, the Grosses decided they wanted to become more involved in biblical creation ministry. They sold their house and began following ICR speakers to various events across America. As volunteers, they helped sell books and explain the ministry's purpose to others. Eventually, they assisted with ICR Loop Tours for months at a time. "Every Wednesday and Sunday, we were at a different church," remarked Eileen.

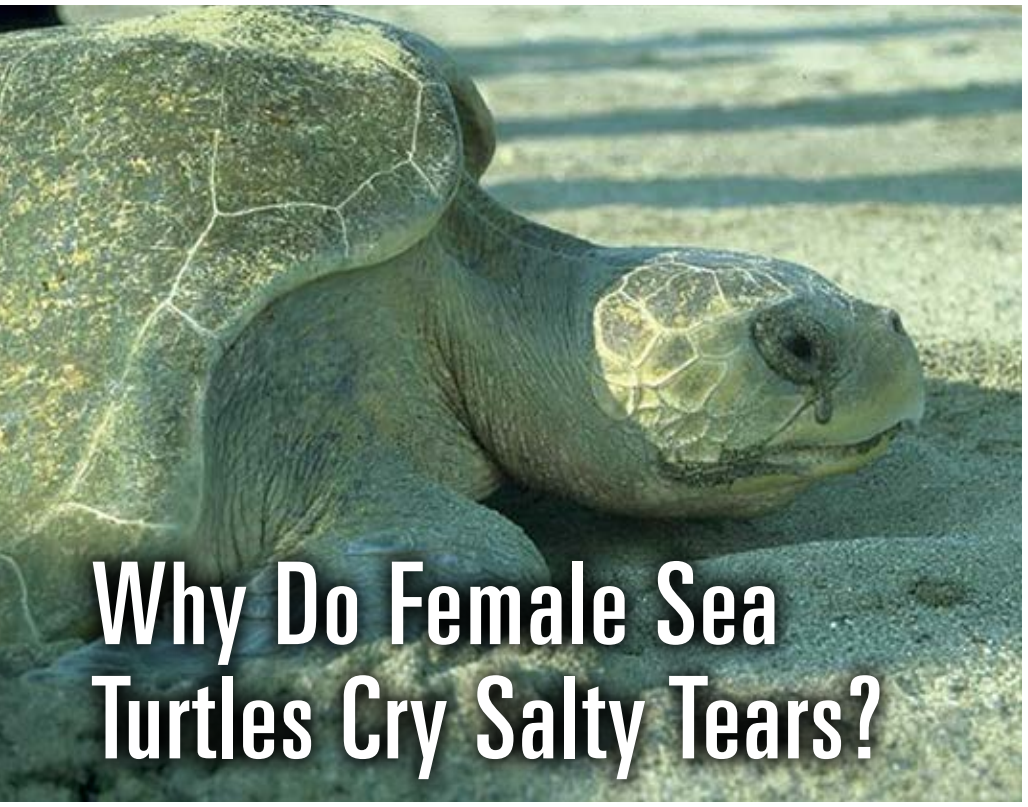
When the tours ended, the Grosses realized that many small churches, especially in the Northwest, couldn't afford to host speakers or travel for seminars. So, the Grosses purchased their "Big Blue" motor home in 2001 and brought ICR materials to those congregations. For over 10 years, Ed and Eileen logged thousands of miles, representing ICR to hundreds of churches across the United States.

Today, both are enjoying rest in heaven along with their brother Tychicus. Although this precious couple can't ever be replaced, ICR remains passionate about connecting with our co-laborers. One of the ways we build these relationships is through our Meet and Greet events. These sessions allow me to meet you personally, present pertinent messages on biblical creation, answer questions about ICR's scientific research, and share our ministry's vision for the future. If you want more information, you can email us at ICRmeetandgreet@ICR.org.

We're grateful for fellow coworkers like you who come alongside our ministry to faithfully steward the truth of biblical creation. Our desire is to continue the steadfast work of the brothers and sisters who came before us—like Tychicus and the Grosses—in proclaiming Jesus Christ as Creator, Savior, and coming King to the farthest reaches of the earth.

Dr. Morse is Director of Donor Relations at the Institute for Creation Research and earned his D.Min. from The Master's Seminary.

JAMES J. S. JOHNSON, J.D., TH.D.



Why Do Female Sea Turtles Cry Salty Tears?

article highlights

- Like virtually all forms of life, sea turtles need water.
- Seawater is too salty for most creatures to ingest, so sea turtles "cry" the extra salt out of their bodies.
- The Lord Jesus Christ specifically designed this trait to enable them to thrive in the open ocean.

Life on a cruise ship can be wonderfully relaxing, but perpetually living at sea has dangerous challenges—just ask a female sea turtle.[1] Her life-at-sea salinity (salt concentration) challenges are literally something to cry about. Finding drinkable water is no problem, but there's too much salt (NaCl) in ocean water for the salinity that sea turtle circulatory systems need to operate. Salt is good, but excess salt is not.[2]

Imagine trying to maintain proper hydration for your body against potentially crushing marine osmosis pressures while the surrounding ocean physically attracts—threatening to suck out—your body's internal fluids. If you're a sea turtle, don't count on imaginary evolutionary luck (natural selection) to invent a real-world rescue.

How do sea turtles adapt to their physical environment since they spend most of their lives in salty ocean water? They're able to survive because the total concentration of various mineral salts in their bodies is perhaps only a half to a third of their habitat's salinity, and the concentrations of their major chemical elements are quite different from those found in seawater.[3]

Sea turtles, like many other marine animals, need resilient internal mechanisms, carefully designed and installed from the beginning, to stabilize electrolyte/water chemistry inside their bodies and balance osmotic pressures. Otherwise, unmitigated osmosis would forcibly equalize the turtles' internal salinity with that of the oceanic environments they swim in.[2,3]

So, if sea turtles couldn't resist the powerful pressure to lose their internal (less salty) water to the outside (super salty) seawater, their bodies would physiologically collapse from lethal desiccation (water loss).[3] Ironically, this same potential dehydration also threatens desert denizens such as camels, chuckwalla lizards, and jackrabbits.[4]

> Unlikely as it may seem, these marine animals share with inhabitants of arid deserts the hazard of death by desiccation. Since their body fluids are less saline than their [oceanic] medium, they tend constantly to lose water by osmosis through all permeable body surfaces, and to survive they must conserve water in the midst of plenty.[3]

So, how does the sea turtle manage the excess salts it receives when drinking ocean water? The Lord Jesus Christ installed large salt glands at the sea turtle's eyes that drain surplus salt into conjunctival sacs.

> Secretions of these [NaCl-desalinating] glands contain a concentrated salt solution that has only small amounts of other dissolved salts. These secretions explain the tendency of the female marine turtle to shed copious "tears" while laying eggs [or while basking on beaches]. The turtle is not suffering in the process, nor is she saddened by the almost certain fate of most of her progeny—she is simply disposing of the salt that she swallowed with her last drink or with her last meal.[3]

So, when you see an egg-laying sea turtle "weeping" on a tropical beach, don't worry—she is just shedding excess salt as she lubricates her eyes. It all makes sense because the Lord Jesus Christ caringly and carefully fitted His creatures—even "wonders without number" (Job 9:10) like humble sea turtles—to fill worldwide habitats, including the saltwater ecosystems that we call oceans.

References

1. The author researched green sea turtles (*Chelonia mydas*) at a West Bay beach on Grand Cayman Island in 2005 while serving as a naturalist-historian aboard Norwegian Cruise Lines' *Norwegian Majesty.*
2. Salt is valuable for good health and tasty food (Matthew 5:13; Luke 14:34-35; Colossians 4:6; Job 6:6), yet it presents desalination challenges to sea turtles. "Excess salt is excreted by eye (orbital) glands…[shedding] copious gluey tears…[which] also protects and lubricates the front of the eyeball." Quoting Colin McCarthy from Dando, M. and M. Burchett. 1996. Sea Reptiles. In *SeaLife: A Complete Guide to the Marine Environment.* G. Waller, ed. Washington, DC: Smithsonian Institution Press, 354.
3. Lane, C. P., ed. 1969. Biology of the Sea. In *Exploring the Ocean World: A History of Oceanography*. Chicago, IL: J. G. Ferguson Publishing, 56.
4. Regarding camels, see Sherwin, F. 2010. The Created Camel. *Acts & Facts*. 39 (9): 16. Regarding chuckwallas, see Martin, J. 2000. *Incredible Creatures that Defy Evolution*, vol. 1. DVD. Directed by S. Greisen. Exploration Films. Regarding jackrabbits, see Johnson, J. J. S. 2017. Rats, Rabbits, and Roadrunners: Fitted to Fill. *Acts & Facts*. 46 (7): 21.

Dr. Johnson is Associate Professor of Apologetics and Chief Academic Officer at the Institute for Creation Research.

I am a retired RN, and I am so excited to have read Dr. [Randy] Guliuzza's article "How Darwin Poisons Science" [in the September/October 2023 *Acts & Facts*]. **I sincerely wish this article could be published all over the world.** I plan to make sure that my three grandchildren, ages 20, 15, and 14—all of whom are public school propaganda victims—know the three incorrect processes that Darwin and so many evolutionists have used to reach their "constructed historical narratives." Thank you so much for all you do. I will be praying for you all.

— D. P.

I went to public school and was taught that we evolved from sea slugs, or some such teaching. **It wasn't until I was saved that I knew with every fiber of my being that creation is true and evolution is a lie.** I'm so very thankful for the Christians who have been the pioneers and trailblazers in the scientific world and have given us fantastic resources to learn and teach from.

— E. I. F.

Once you start to critically evaluate evolution you can see that there are gaps in it—the data and the logic—that are big enough to drive a truck through.

— D. S.

Not only is our solar system designed in such a way that life on Earth can flourish, but our moon—whose origins completely elude scientific explanation—make life on Earth possible because the gravitational pull of the moon moderates Earth's wobble, keeping the weather very, very stable. **I love God's Intelligent Engineering Design!**

— G. O.

Some things are just common sense. **Creation is one of those things.** That the immense complexity of life could have just randomly happened without intelligent involvement is just absurd and is, in fact, impossible.

— B. C.

I want to bring the rest of the crew back [to the ICR Discovery Center] so they can see it firsthand for themselves! **I was overwhelmed to another level of what our Creator spoke into existence.**

— A. J. G.

The way they presented the scientific evidence along with Scripture and biblical events was perfect! It seemed great for all ages, too.

— A. B. B.

We have one happy boy today. We went to the ICR Discovery Center museum this morning, and it was an amazing experience! Of course [he] was all about the dinosaurs.

— K. B. D.

I just ordered all four books on *God Created—Cats, Birds, Monkeys, T. rex.* Fascinating for all ages. Loved these colorful books. Ordered for my granddaughter, who is 12. **I loved them, and I'm in my 70s.** Can't wait for more.

— D. T.

Editor's note: I'm sure your granddaughter would also love our newest one, *God Created Horses*. You can find it at ICR.org/store.

Have a comment?
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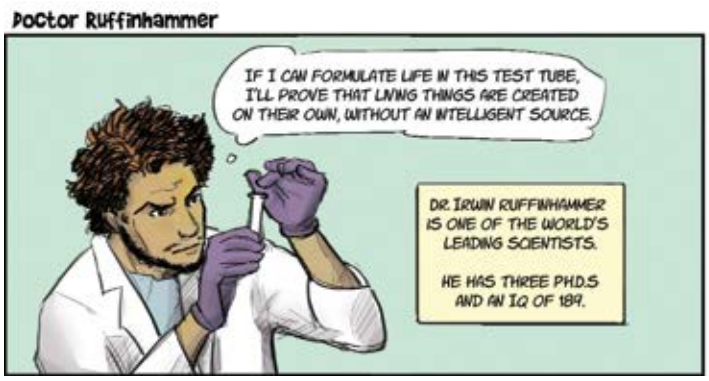

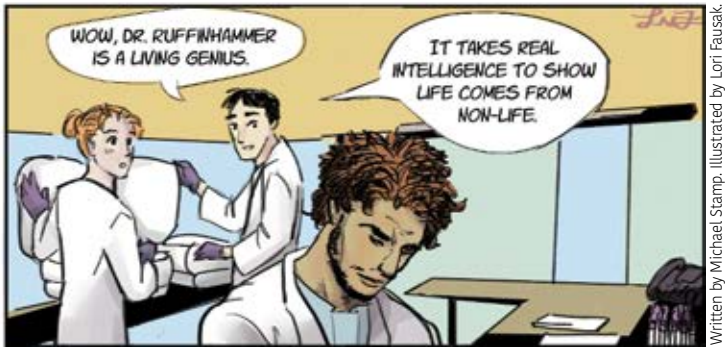

Written by Michael Stamp. Illustrated by Lori Fausak.

Creation Kids

Pumpkins

ICR INSTITUTE FOR CREATION RESEARCH

God gives us many reasons to be thankful for pumpkins! These festive squashes are native to North America, and over a billion pounds are harvested in the U.S. each year. The planting season usually begins in summer, and pumpkins are popular as the weather gets cooler. Did you also know...

- Pumpkins are super-healthy food. They're full of essential vitamins and minerals, fiber, and protein. The seeds are good for you, too!
- There are over 100 varieties of pumpkins. They come in all sorts of colors, like orange, green, white, yellow, pink, and blue.
- Pumpkins grow from the flowers of their plants, which makes them a type of fruit.
- The world's largest pumpkin was over 2,702 pounds.

Did you know?

Pumpkins are known as winter squash because they have a firmer rind than summer squash, like zucchini. This allows them to be stored during the cold months.

Circle five differences in the pictures below.

Name That Pumpkin

Many pumpkins have silly names. Which of the options below isn't a variety of pumpkin?

Autumn Gold	Knucklehead	Blue Doll
Cinderella's Carriage	Polar Bear	Goosebumps
Long Island Cheese	Pumpkin Spice	Munchkin

Answer: Pumpkin Spice

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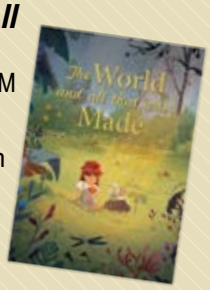

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