Thursday Night Nachos

(Defining Evolution to Debunk Darwin)

Feb 2026 edit
Bryan Melugin

TABLE OF CONTENTS

About the illustrations:

I used AI. I don't know why people need to know this, but it's a big deal to some people, so there you are. The characters and illustrations were originally made by me, mostly using Photoshop, but in this version I fed those images into AI and told it to make them better and of a style, and so here we are. And I still had to do a lot of editing. On the other hand, AI had nothing to do with the content of the text. I wrote it all myself, good for me, pat on the back and such.
So now you know.

Author's Note:

The character Carl, in his passionate defense of Evolution, says many things which you may think are absurd and irrational, for example how he chooses to define "evolution" and almost everything he says about the Darwinian Tree of life at the end of chapter two. You may feel I am unfairly representing the evolutionist in this discussion because of dialogue such as that. However, I did not write all of Carl's dialogue. For example, all of the nonsense he says at the end of chapter two is from conversations I actually had with Evolutionists who came to my blog to tell me how stupid I was to not believe in evolution, but who themselves could not define what it was, and who said things in their attempt to explain my stupidity what were so astounding that I have often cut and paste them here into the mouth of Carl because, had I simply made it up, I would not have believed it either. But I have actually had these conversations with a lot of people over the years, and I have them to thank for this book. If it were not for the silly people of the internet and their frequent attempts to let me know how stupid I am, this book may never have been written. At the very least the character of Carl would have been a lot less entertaining.

Defining Evolution 1: The Fight Almost Starts

Another Thursday night out with my friends and we were waiting on a plate of Nachos which was so big I am forced to capitalize the word ***"Nachos."*** After long days in the salt mines we make a point to carve out this sacred time to rally round the nourishment inspired by our neighbors to the south and sharpen our wit with conversations about important topics - Big Questions.

Joining the old Rent-A-Friend (myself) here at **Danny's Bar, Grill, and House of Rabblerousing** are:
Bill, a doctor who lives in my neighborhood,
Tom from shipping records accounts receivable (*Who moonlights as a Private eye and ladies' man*),
Carl, an Assistant Administrative Management Accounts Specialist *(Who spends his weekends leading a crack team of mercenaries*), and
Captain Blue Beard, who claims to be a pirate, though very little is actually known about him other than the fact that he took a painting class with me at a local community college.

Over the clinks of forks and plates and the slurp of freshly poured root beer, we are discussing the recent smash theatre blockbuster, ***Avengers, The Age of Ultron***. Not to give away any spoilers, but in the film, Ultron is a medium sized killer robot who has decided that the human race needs to evolve, and to accomplish this goal he devises a plan to kill off most of the human race. Interestingly, this was the same plan Hitler had devised, but he *(And I suspect this was not from a lack of trying)* didn't have an army of robots to do his evil bidding, so he had to settle for a horde of easily influenced German lads. But I digress. The point is, Ultron wants the human race to evolve, and while my memory is a little fuzzy, I think he monologues about the history of evolution, from bacteria to worms to fish to man, blah blah blah. Or maybe that was a different movie,

like the X-Men, or any of the Jurassic Park movies, or most any other movie that has to do with the past or dinosaurs, or a group dedicated to killing most of the human race. Magneto and Ultron would have seen eye to eye with Hitler about a great many things. And possibly Megatron and Richard Dawkins, but again I digress.

Carl, himself not a great lover of people in particular, sides with Ultron, at least in principle if not in execution.

"The human race needs to continue evolving or we will go extinct!" he said with passion.

"I have to disagree with you immediately, Carl," I interjected. "In order for the human race to continue doing something, they must have already been doing that something."

Carl let out an exasperated sigh and rolled his eyes. "Oh, we all know where this is going. Rent-A-Friend is going to lecture us on how he knows more about science than the thousands of PhDs who write textbooks."

"I find that entirely plausible," said Blue Beard. "PhD merely means Piled Higher and Deeper. Or, Permanent Head Damage." He chuckled to himself as Carl stewed, and then said, "No offense meant, Bill."

"None taken," said Bill. "I'm an MD, not a PhD, and MD stands for Mighty Doctor! But I think before Carl and Rent-A-Friend begin debating whether or not evolution is a fact, we might want to decide what we mean by the term **Evolution**."

"Well, it's science," said Tom.

"I beg to differ, Tom," I said. "It's a religion merely meant to replace Christendom in the western world."

"You're a paranoid duck," said Carl. "It's no more a competing religion than physics, astronomy or global warming."

"Actually, it's climate change now," said Blue Beard with a smirk behind his great, blue beard, "on account of there not being any global warming."

"But what IS evolution?" I asked. "Define it for me Carl."

Carl grunted with the annoyed look one might have if you asked them to solve a few first grade math problems. "It's a scientific fact with mountains of evidence supporting it and none opposing it," he said with a confident disdain.

Bill had been searching the old interwebs for a definition. "How about this from that science website Carl loves? *"Evolution is a big category of different things that affect life on earth"*."

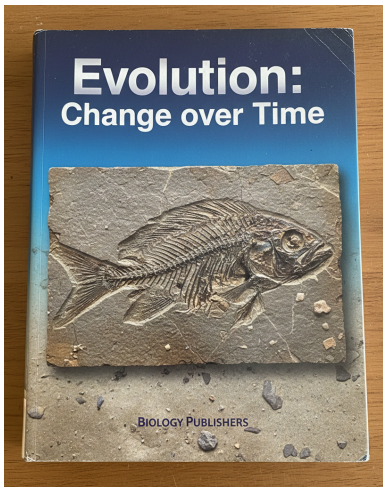
"That's perfect," said Carl.

"No, no," I said. "That won't do. LOTS of things affect life which doesn't make it evolve. Going extinct, just to name one big change which might occur in the course of things."

"But the evolutionary history of life on earth has included many extinctions," chimed in Tom. "The fossil record tells us that more than 95% of the species which ever existed have gone extinct."

”Then why are we wasting so much time and money trying to save some of the pesky critters what’s got on the wrong end of the endangered species list?” demanded Blue Beard.
“I’ve wondered that myself,” I admitted, “but it’s a bit off topic. I was just pointing out that extinction fits the definition Bill gave us, but cannot itself BE evolution. If anything, it would happen outside of or alongside or, or maybe even because of evolution, but would not itself BE evolution. And I still want Carl to define what he means by “evolution” for us.”
“Bill just told you,” replied Carl, “it’s a big category! Don’t go pushing the burden of proof off on me just because you’re suddenly demanding expert level specifics.”
“Is a **definition** *Expert Level Specifics*?” I asked, but the attention of my comrades was arrested by the approach of something that combines the glory of a sunset with the awe of a train wreck - Our lovely and affable waitress, Wendy, arriving with our colossal plate of nachos.
“Here you go, boys,” she said, placing it amidst us.
“Wendy,” said Bill, “Do you believe evolution is something that happens?”
“Oh sure,” she said. “I took a whole class on it in college.”
“Could you define it for us?” I asked.
Wendy thought for a moment. “Evolution is the way living things change over time.”
Blue Beard let out a scoff and then said, “Like when they gets a haircut? Or fall into a volcano and die? Thems would be changes over time, what?”
“Well, not little changes to one member of a species,” Wendy replied. “It’s the changes that happen over time to whole populations.”
“What kind of changes?” Blue Beard Demanded.
“Well, the kind that drive evolution,” she said. “You guys need some refills?”
“Root beers all around,” said Bill.
Wendy headed off and we dug into our nachos. There was a contemplative silence as we sat thoughtfully munching on great handfuls of nacho goodness. After making a sizable dent in my side of the nacho plate, I said, “There’s something about her definition which doesn’t work. Tom, how would you define ‘evolution’?”
Tom finished a mouthful of nacho with eyes that indicated that, behind his purposeful chomping of nacho there was much activity in the old gray matter. “I don’t know that I would say much different than Wendy,” he said. “I would probably just say that it’s ***change over time***. That’s how I’ve always thought of it. We had a textbook in middle school science that was called, “Evolution, Change Over Time,” and I always kind of thought that it summed it up well enough.”
“And it does,” insisted Carl.

“But Wendy essentially said that evolution is the changes that cause evolution,” I reminded them. “Something can’t be both a cause and an effect. Her definition is just too fuzzy to really mean something.”
“It’s a scientific fact,” said Carl, waving a handful of nacho for emphasis. “That’s all you need to know.”
“He doesn’t know,” scoffed Blue Beard, gesturing to Carl with a loaded chip. “Carl’s certain that Darwin’s Monkey story is a fact, but he hasn’t let data or information cloud his decision.”
Carl’s mouth was too full of Nacho for us to understand his response, but the look on his face indicated that it would have been made of words inappropriate for a family establishment. I chose to pick up the slack before he could clarify himself.



“I’ve had a lot of people, not just Carl here, tell me that evolution is a fact and that I am a silly person for refusing to believe it, but when I ask them what it is, they tend to go silent. I often suspect that they can’t make it clear, though they still defend it with the same vigor. I can understand why they take a pass.”
“Once they take a good look at whatever they’ve written,” interjected Blue Beard, “they make extensive use of that DELETE key because, whatever they’ve written, it was at best merely silly. So, naturally they prefer to say nothing at all.”
“I understand,” I said, “but on my end this makes for a dull conversation. I would prefer they have the honesty to simply say, “I would tell you what evolution is, but I cannot explain it in a way that does not sound profoundly ridiculous.”
“I think perhaps we need to do this little diddle world a favor,” said Bill with some pep. “Whatever side of the aisle you sit on, I suspect that there are things you don’t know and have not considered, you see. So let us, the five of us, and Wendy, and these Nachos, all do some research and get our brains to thinking hard, you see, and come up with a definition which is clear and useful.”

We all agreed that this would be an undertaking quite worthy, which we would begin the following week. In the meantime, we did what we could to overcome the Nachos before us and settled back to listen to the local band of the week and toss some darts. I for one was eager to see what we would learn the next week.

Defining Evolution 2: The Tree of Life

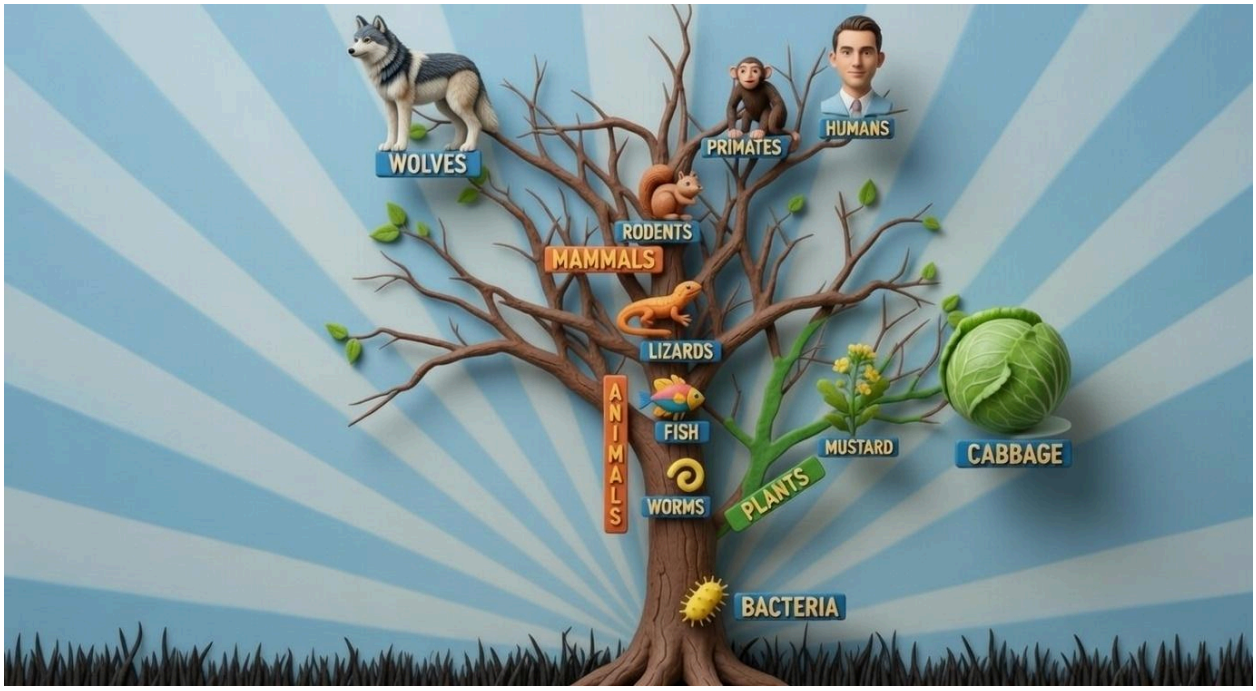
It was another beautiful Thursday night at Danny's Bar, Grill, and House of Rabblerousing, and by "beautiful" I mean "spent consuming mass quantities of root beer, nachos, and various other foods which are pictured on those posters warning one of the threat of heart failure." With me at the round table in the corner by the dart board were my friends Bill, Carl, Tom, and Captain Blue Beard.

We meet regularly as a sort of support group for men with jobs and whatnot. Giving each other a leg up dealing with the acquisition of the old American Dream. We usually banter about the week's adventures, counting the death toll as sales clashed with marketing, or recounting the destruction done to one's stain resistant carpet by one's own pint sized flesh-and-blood, and of course we often have lengthy discussions about any movie which was based on a comic book or graphic novel. However, this week we have a prearranged topic of discussion for the enlightenment and education of all the western world.

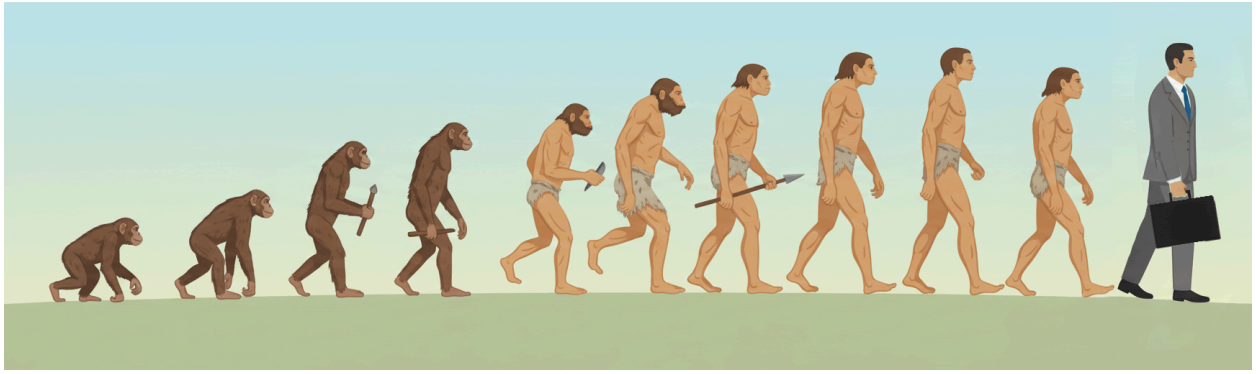
Just last week I was all set to begin another row with my friend Carl over the historicity of Darwinian Evolution, when our friend Bill made a very wise suggestion that we first endeavor to define the term. After all, how can Carl say that Evolution is, or I say evolution is not true if neither of us can define what it is? We might not even be talking about the same thing, like that time we argued for two hours about the quality and entertainment value of the Batman movie, when it turns out I was talking about the one starring Adam West *("Some days you just can't get rid of a bomb!")* and Carl was talking about the Christian Bale one *("Swear to me!")* and Tom was talking about the Michael

Keaton movie *(“Did you ever dance with the devil in the pale moonlight?”)* and Captain Bluer Beard was talking about the Tic animated series, which really shows how little he was paying attention during that particular conversation.
I opted to begin with my favorite educational tool - visual aides.

“My research has uncovered a huge collection of variations on these two images,” I said producing the Darwinian Tree of life, and the monkey to man parade which has gone by many names since first being published, and even variations via parodies.
“They all show the gradual progression from bacteria to worm to fish to lizard to rodent to man to Captain James T Kirk through slow, gradual changes over millions of years. This is the story evolution tells, and the map of those changes over time is what we call the Darwinian Tree of Life.”

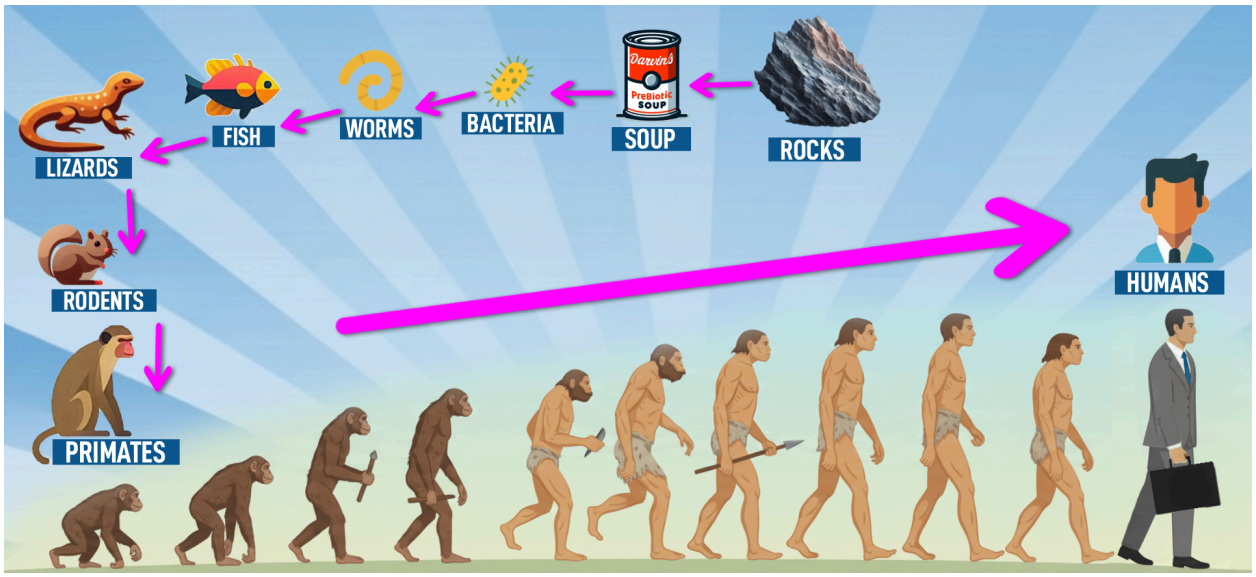


“How’s the monkey parade the same as the tree when all it has is monkeys and men?” asked Blue Beard.



“The tree is meant to show a general history of all life on earth,” replied Bill, “whereas the monkey parade is meant to indicate one chain of links on one branch near the top of the tree.”

“Right,” I replied. “Every branch on the tree diagram would, hypothetically, branch out into a wide range of variations which, individually, could look like the monkey parade. Of course none of these trees is entirely complete, because they would require the depiction of millions of species with millions and millions of intermediate forms (aka: Missing Links) between them, and frankly, no one has that much blank paper or free time on their hands.”



“When the tree branches,” explained Bill, “that means an existing animal kind has diversified into two distinct groups. For an example, I think we can all agree would be an evolutionary branching,” he said, pointing to a worm on one of the tree pictures, “imagine if worms divided into two groups - one of which remained worms of various kinds, and the other of which became fish.”

“There would be a lot of steps involved with the addition of a lot of genes,” I suggested. “Genes for eyes, genes for gills, genes for fins, genes for a swim bladder, genes for saying ‘bloop bloop’ in children’s books where the principle characters are animals who can talk, etc.”

“So when worms evolve into fish,” Bill continued, “that doesn’t mean EVERY worm becomes a fish - it means that SOME worm gets a beneficial mutation which SOME of its offspring get, and some of those descendants get other beneficial mutations added onto that one - and this happens over and over until the worm has the genes for eyes, and thus eyes and also gills, and whatever other parts make it a fish.”

Blue Beard grasped his root beer and said, “Somewhere in the middle I suppose it’s part fish and part worm, which means Disney princesses are wrong - a Wish is a Fish that’s still part Worm. You can’t do that upon a star.” He drank thoughtfully for a moment and then added, “Well, you could, but it would be disgusting.”

I turned to Carl. “You’ve been quiet, old friend. What are your thoughts so far?”

“It’s no different than what I said last week,” he replied. “Evolution is a broad category which pertains to living things changing over time and these pictures are a depiction of the history of those changes.”

“Once again I have to argue that your definition is too vague,” I replied. “Undoubtedly a lot of things can happen to plants and animals which do NOT cause the growth of the Darwinian Tree of life and creation of new species or kinds, such as being eaten.”

“Falling into a volcano,” offered Blue Beard.

“Having a light breakfast, or getting a haircut,” added Bill.

“But none of those things should be included in the definition of “evolution,” I said, “because none of them affect the tree of life by causing it to grow and develop new species, kinds, orders, classes, etc.”

“This is why I think it’s good to present the tree of life in its broadest terms,” interjected Bill. “Bacteria to worm to fish to lizard to rodent to primate to us. There are a lot of things which can happen within a kind of animal which will not grow the tree in this manner. Take the dog kind for instance. Wolves can and did become, over time, Collies, Labs, Terriers, Poodles and Chihuahuas. These are all different, but they are all DOGS.”

“Wolves giving rise to other dogs IS evolution!” insisted Carl. “That’s descent with modification. It’s a textbook definition of evolution!”

“It’s true,” said Tom. “I have that textbook.”

“That may be,” said Bill, “but we can’t say for certain until we agree on a definition.”

“What’s wrong with saying evolution is descent with modification? If it's a good enough definition for college textbooks it should be good enough for us!”
“Same as before, Carl,” I answered. “*Modification* is too vague a term. It can mean ANY kind of change, and as we’ve all acknowledged, change can be good, bad, big or little, but not every kind of change will cause the tree of life to grow. Extinctions will change the tree, but only by killing off a limb which was already on the tree. We need to explain how the limbs got there in the first place, not how they get cut off once they’re already there.”
Carl took a swig of root beer and said, “I think we can agree that wolves becoming every kind of dog, from Mastiff to Chihuahua is evolutionary modification. That certainly grows the tree.”
“Sorry, Carl,” I replied, “but I don’t think so. Each kind of animal can spread out into a vast shrubbery of variations on the kind without ever adding a branch onto the Darwinian Tree. This is part of the Biblical Creation model of life on earth - the Creation Orchard. Dogs give rise to different dogs and fish give rise to different fish, but fish never give rise to dogs.”
“But that is exactly what Darwinian evolution claims,” said Tom “that fish DID give rise to dogs. Through a lot of steps I mean.”
“That’s right,” answered Bill. “What must make Darwinian Evolution distinct, and what must make a mechanism of evolution ***a mechanism OF EVOLUTION*** is the ability to make a NEW kind of animal with NEW genes for NEW features and behaviors. That’s why it’s wise that we consider those big changes, from fish to wolf, and not merely the smaller changes like wolf to poodle.”
“Also,” said Tom, “there has to be a connection of common ancestry into the past through LOTS of kinds reaching back to the bacteria at the base of the tree. Apparently we all agree that poodles have a common ancestor with modern wolves, but we need to define evolution so poodles and wolves and us all have a common ancestor which is a fish.”
“Well said, Tom!” offered Blue Beard. “If Rent-A-Friend here is right, then the fact that Poodles and Chihuahuas have a common ancestor which is a dog isn’t merely Darwinian. It’s also Biblical. Somewhere, if evolution is true, wolves share a common ancestor with fish and with cabbages.”
“Cabbages probably branch off earlier,” suggested Tom, “but in terms of the full story, yes. Evolution would claim that somewhere on the tree is a common ancestor of wolves and cabbages. In fact, of ANY two living things on earth.”
“Let’s consider the genetic component,” suggested Bill. “Evolution REQUIRES the creation of new genes. Existing Genes being shuffled so that there are new combinations of already existing genes is not Darwinian. Already existing genes being lost over time is also not Darwinian.”

“Why not?” asked Tom. “When you shuffle genes you make new combinations that didn’t exist before. Isn’t that making new genetic information? Isn’t that evolution?”

“If you have a population of bacteria with, say, 1000 genes between them,” said Bill, “and they share those genes with each other to make new combinations of genes over and over for billions of years, not a single one of them will ever gather the right combination of genes it would take to make a moose.”

“I think I can explain this,” said Blue Beard. “Tom, do you know what the Archduke of Hearts card looks like in a standard deck of poker cards?”

“No.”

“Course you don’t. It don’t exist.” Blue Beard produced a deck of cards from inside his coat and spread them out before us. “No deck *HAS* an Archduke of Hearts. Now, get a thousand monkeys, and give them each a deck of poker cards. Lock them in a room and make them shuffle those cards for a thousand years,” he shuffled them to demonstrate and I imagined him as a monkey, which was not hard to do, “and do you know what you will have at the end of it?”

“What?” asked Tom.

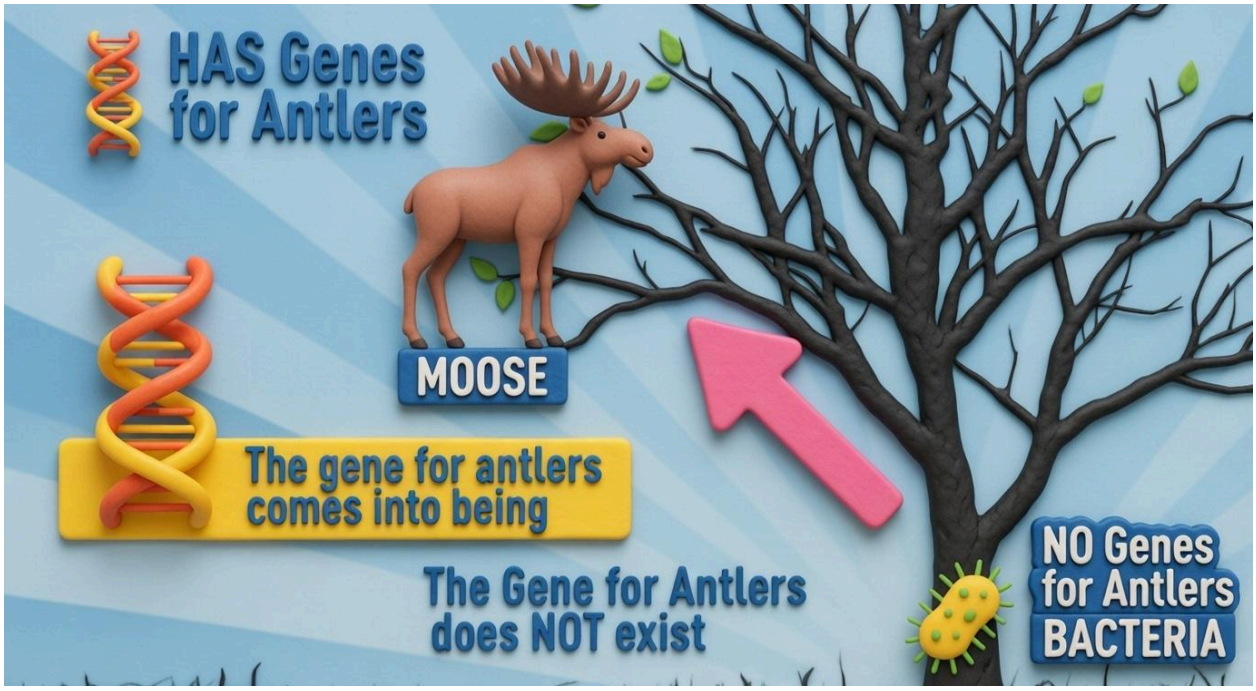
“You’ll have a room full of dead monkeys. So don’t actually do that. What you will NEVER have is a deck that contains the Archduke of Hearts. None of the decks contained it when they started shuffling, and none of the decks will gain it BY shuffling.”

Bill gestured to our pirate friend with his root beer. “So in your analogy, the Archduke of Hearts is a gene which is required to make a moose which the bacteria do not have. Say, the gene to make antlers.”

“It probably takes more than ONE gene to make Antlers,” complained Carl.

“But let’s pretend it only takes one, just to keep it simple,” Bill said.

Secretly I was disappointed that Blue Beard didn’t follow up with a magic trick, but his point was well made. “In order to make the tree grow,” I said, “from worm to fish to lizard, there needed to be the creation of new genes, not merely a rearranging of genes which already existed.



“Let us remember” I said holding up the pictures of the Tree of Life, “that evolution is a story which tells us that bacteria gained new genes over and over until it became worms which became fish which became wolves, and all of these steps require additions to the genome.”

Carl snorted with disdain. “The bacteria to worms to a man walking around town is an old creationist song and dance that no evolutionist argues for.”

I paused for a second to make sure I had heard him right. I looked at the picture of the evolutionary tree I was holding, and then I held the picture of the tree up to Carl. “I got this from an evolutionary source Carl. I have six of these,” I held up the other images of the tree of life, “all from popular, evolutionary sources. I think perhaps you had better explain what you mean by “Evolution” if you don’t mean bacteria to worms to man. You may mean something so far removed from Darwin that you shouldn’t even be using that word.”

“My point,” pontificated Carl with a sneer, “just to clarify, is that your bug to man canard is such a small part of the story that it’s a cartoon. It’s the kind of thing that makes otherwise literate people say *“my grandpa weren’t no monkey!”* It’s a straw man used to insinuate something that is only partly true but easily dismantled.”

“The Darwinian Tree of Life is a Straw Man?” I said, perplexed. “Carl, if you are rejecting the Story Darwinian Evolution is meant to tell, then what is it you are meaning by “Evolution”? If the alleged history told in these trees is not what you believe Darwinian evolution teaches, then present what YOU think it is.”

Carl drank some root beer and stared off toward the kitchen, no doubt anticipating the arrival of Wendy with our mountain of Nachos. “To be frank,” he said in the direction of

the kitchen, “I’m not interested in your definitions of evolution or genetic variation. They mean specific things to working evo bio folks and I’ll stick with those definitions.”
“To be frank,” said Bill, “I am interested in your definitions, at least of Evolution and of how you think new genetic material is created, since that seems to be the central point of this particular discussion.”
“What is taking those Nachos so long?” said Carl. “I barely had time for lunch. I’m starving.”
“Carl,” I said, also secretly hoping the nachos would come soon, “why not just answer the simplest and most central question- what is evolution? Surely if you know it’s true, you must know what it is? Surely if you have written a sixty part blog series defending it as truth, you must, SOMEWHERE in all of that dogma, DEFINE what it is you are defending?”
“You wrote a SIXTY PART BLOG SERIES on evolution?” asked Blue Beard, incredulously.
“Yes, said Carl. “I had a lot to say on the subject.”
“Except what it is, apparently.”
“Shut your blue entrenched mouth,” growled Carl.

“I’ll be shutting my blue entrenched mouth around some Nachos, thank you lad.” Blue Bear gestured toward the kitchen with his root beer. “Here comes Wendy!”
And with that the Nachos had arrived and we were soon drowned out by the sound of our own eating and then the sound of a local cover band doing a truly pitiable rendition of *Lucy in the Sky with Diamonds*.

Our conversation would have to continue the following Thursday.

Defining Evolution 3: Four Things Evolution HAS to Be

Another Thursday had flowed into our temporary “now” though a week of paper jams, low toner, canceled and rescheduled meetings and paperwork filled out in triplicate. As per usual, my friends and I were greeted by a chipper Wendy, our dependable waitress at Danny’s Bar, Grill, and House of Rabblerousing, her arms full of tall mugs of frosty root beer and a plate of the Buffalo Wings which were on special due to some sports event of which I had failed to take notice. Some local team won something and to celebrate, wings were half off. I don’t have to know the reason to appreciate half price wings.

Just as Wendy headed off to put in the order for our usual mountain of Nachos, Bill joined us at the old round table near the dart board to continue our ongoing discussion on the true meaning of Darwinian evolution. We had decided that, before we could argue about IF evolution is a fact, we had to know WHAT Darwinian Evolution was. You can’t begin to look for evidence for or against something if you can’t define the something. Try it sometime and you will see what I mean.

Post our usual pleasantries where in Tom exhumed the dread of a thrice cancelled and yet mandatory meeting, and Carl gripped about the third quarter projection analysis spreadsheets, and Blue Beard hinted at having to leave the country for legal reasons, Bill got right to it as he reminded us of an analogy our seafaring friend had displayed at our last Nacho roundabout.

“Captain Blue Beard had made the analogy that shuffling a normal deck of cards will never produce the Archduke of Hearts,” Bill reminded us, “because the deck doesn’t contain it in the first place.”

“Aye!” exclaimed Blue Beard with a frosty mug held high. “Let a thousand monkeys shuffle a thousand decks of cards for a thousand years and one will never have the Archduke of Hearts, or any other card which was not in the original deck.” He smiled, proud of himself for having contributed so well.

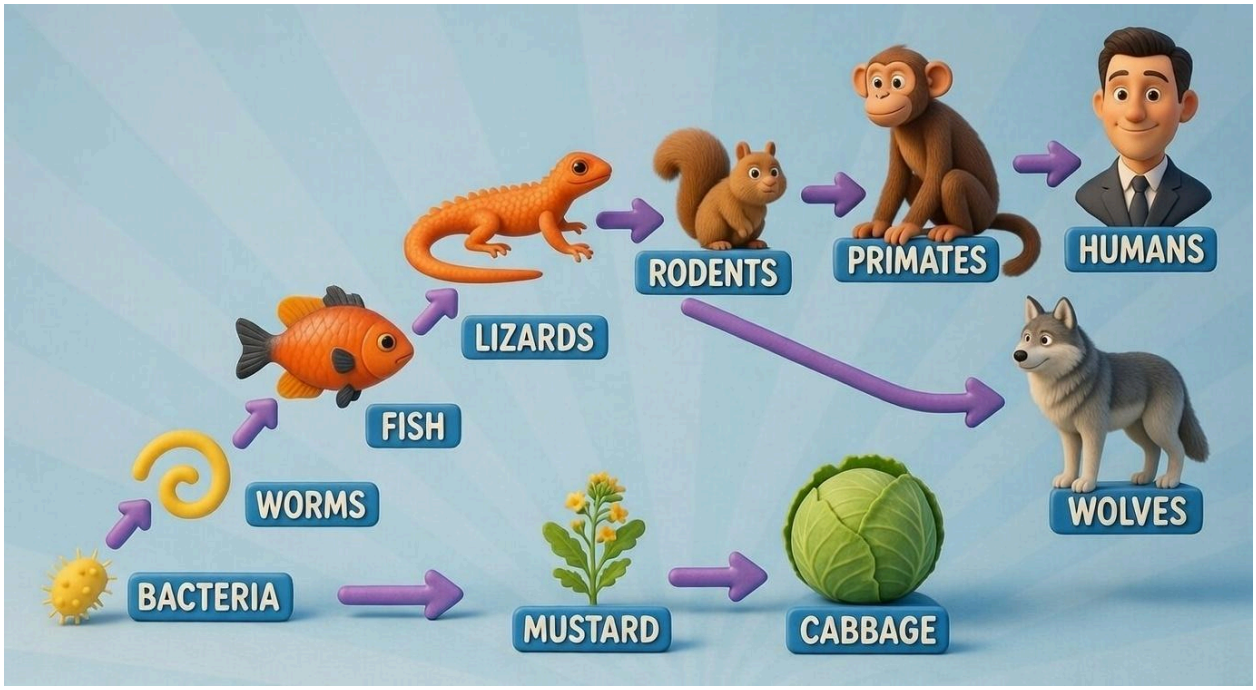
Tom spoke up. “The metaphor being,” he said, “that bacteria shuffling the genes it takes to make bacteria will never shuffle enough to make the genes it takes to make a worm or a fish or a cabbage or a wolf.”

“Well spoken, Tom!” shouted Blue Beard, clinking his glass against Tom’s a bit harder than was necessary.

“Some of the monkeys will eat some of those cards,” noted Bill. “You will lose cards even faster than you lose monkeys. But once again, this will never create the Archduke of Hearts. Thus, while shuffling genes can make new variations on the wolf, and losing genes can make horrible mutants like the poodle and Chihuahua, those changes aren’t EVOLUTIONARY changes because no amount of time will ever allow those changes to make NEW genes for new features and behaviors. You can breed dogs with dogs for a million years, and again, none of them will ever wind up with the genes it takes to make a moose.”

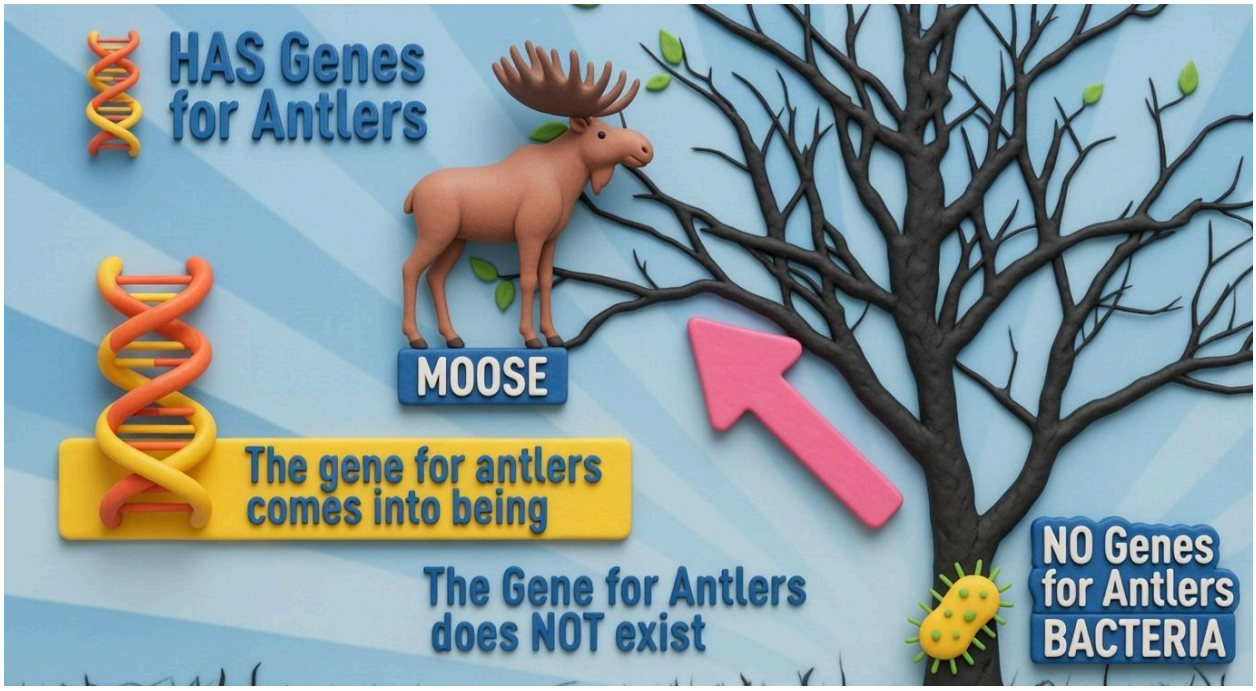
Blue Beard raised his glass in celebration. “I for one am thankful. The world doesn’t need a dog that necessitates a pooper scooper so big it takes more than three strong men to use it.” Crass though he may be at times, Blue Beard often makes a good point which is hard to argue with.

“However you define it,” I added, “Evolution tells a story: Plant and animal kinds that did not exist in the past *(such as Cabbages and Wolves)*, exist now, and evolution claims to be the process which created those plant and animal kinds *(E.g. Cabbages and Wolves).”*



“Building a plant or animal takes genetic information in the form of genes,” said Bill. “In terms of genetics: Genes that are necessary to build plant and animal kinds that did not exist in the past, exist now, and evolution claims to be the process which created the genes required to make the plant and animal kinds which exist now.”

“Do you get it, Tom?” asked Blue Beard. “Plants and animals and the genes required to make them exist now, when they did not exist in the past. Not COMBINATIONS of existing genes which did not previously exist. But the genes individually exist now, and did not exist in the past, and thus somehow came into existence.”



“Sure, I get it,” said Tom. “At one time in the past, wolves and cabbages and the genes required to make them did not exist. Now they do exist. Previously they did NOT exist. SOMEHOW they came to exist.”

“Evolution claims to be that somehow,” I said.

Carl set his root beer down with some impatience. “I still don’t see what was wrong with defining Darwinian evolution as “Decent with Modification,” he said. “The National Center for Science Education defines it that way. And I’ve got a whole list of other sources which give similar definitions. Why are we arguing about this when professional scientists have already defined the term for us?”

“I anticipated this question,” I said, “and I think I have a list of concepts which we will all agree must be accepted as we seek to define this slippery term.”

My friends agreed and each grabbed a buffalo wing as I got out my list, hand written on yellow legal pad. That fact isn’t important to what follows, but I sincerely love writing on legal pads. It makes everything seem so much more official. Perhaps because it’s called a “Legal Pad.” Like it has a courtroom stamp of approval. Perhaps it’s the kind of paper laws are originally written on before being put into action. I suspect if they called it “Nerd Paper” I would not be as enthused. But I digress.

“**1. Evolution is something to do with living things.**” I looked up to check for comprehension, and behind their newly buffalo orange faces they all seemed agreeable enough, so I continued. “So, any definition which cannot be specific enough to mean biological evolution is not good enough. For instance, “Change over time” is far too vague, as EVERYTHING IN THE UNIVERSE changes over time. Thus, that definition is not specific enough to be useful. Any definition where in we COULD be talking about rocks, or social media trends is not specific enough to tell us what Charles “Chuck D.” Darwin was talking about.” Again everyone seemed happy enough to go for more wings instead of arguing, so I kept on.

“**2. Evolution is something about life changing over time.** Thus, any definition where in living things do NOT change over time is not good enough. If your definition includes living things staying the same for long periods of time, you are not talking about Darwinian Evolution.”

“Hang on,” said Carl. “Things DO stay the same at different times during the history of evolution. Things aren’t making drastic changes each generation or this whole thing wouldn’t have taken millions of years.”

“Actually,” said Tom, “three and a half billion years.”

“Right,” said Carl.

“Of course there are periods in the story where things do not change,” I said, “but even if you accept that those periods of stasis happen within the evolutionary history, you would agree that those periods of stasis are not when the evolution is happening. It’s when things do NOT stay exactly as they were which evolution happens.”

“Come now, Carl,” said Blue Beard. “Even you must admit that! If Evolution is things changing, then it must be something OTHER than long periods of NOT changing. Right?”

Carl shrugged and dug back into the wings in agreement.

“**3. Evolution is something which is intended to explain the origin of different kinds of plants and animals.** The story Darwinian Evolution tells is, once upon a time there were no (*name of plant or animal kind*) but over time (*mechanisms of evolution*)

happened until (*name of plant or animal kind*) came into being. Thus, any definition which doesn't explain how new kinds of plants or animals can come into being is not evolution."

Blue Beard finished a swig of root beer and added his two cents. "So if the definition describes changes where in the same species from the past is STILL HERE *(Like getting a haircut, or having a sensible lunch),* or if one which WAS here has gone away *(Like going extinct),* we are not talking about evolution."

"Just to make sure we agree here," said Carl, "the definition doesn't need to specify and describe all of the mechanisms of evolutionary change, right?"

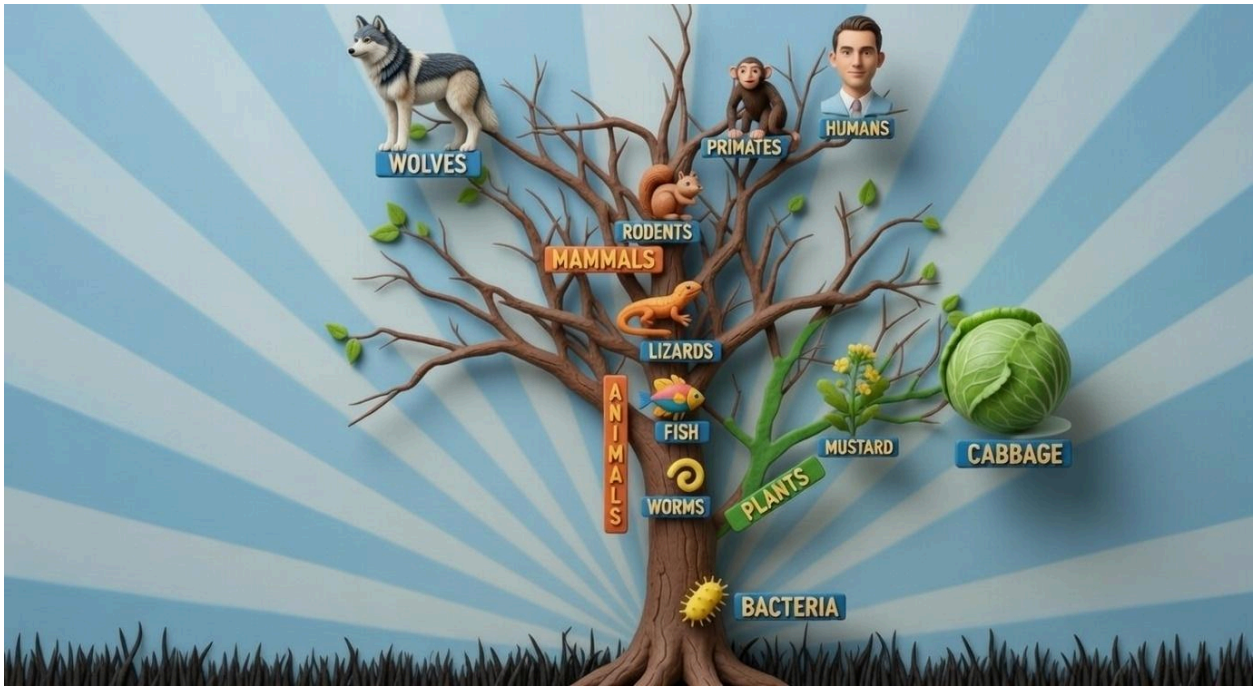
"No, of course not," I said. "We don't need expert level specifics. It's just a definition." Carl rolled his eyes and I continued.

"**4. Evolution tells a story where in all living things arose through past common ancestors until, far enough back in time, we reach a first universal common ancestor, making the history of life on earth a big tree of life.** Or going forward in time, it explains how simple things like bacteria became worms which became fish which became lizards which became rodents which became primates which became humans." This again seemed to be met with general agreement from the sauce faced comrades around the table.

"Thus, any definition which fails to account for the growth of the tree is not good enough," added Bill for clarity. "Once again, extinction events are fun to watch on Blu-Ray, but they do not GROW the tree of life. They do not explain where NEW animals and plants which previously did not exist ***come from***. No species will arise through extinct common ancestors, just to mention one flaw in using extinction in the definition. If perhaps you don't have a MD in the medical arts like SOME of us do, let me explain: Dead animals don't reproduce. I don't mean to perpetuate stereotypes, but in this case I think it is fair to assert that reproducing is something only LIVING things do. That's my story and I'm sticking to it."

Blue Beard found this particularly funny.

"The definition," I said, "must explain how a bacteria can become a worm which becomes a fish which becomes a lizard which becomes a rodent which becomes a primate which becomes all of us." I pulled out one of the illustrations from the previous week showing the Darwinian Tree of Life.



“Is that clear enough? WHATEVER Evolution is, it must GROW the Darwinian Tree of life, which is the pictorial representation of the history of life on earth which Evolution tells and Evolution is meant to explain. Carl, if you’re going to object to this again, now would be a good time to explain why before we move on.”

Carl scoffed loudly. “I simply cannot fathom why you require my definition of evolution. It’s simple and can be read on any site.” Apparently that was all the explanation we were going to get, as he fell silent and continued showing buffalo chicken into his mouth.

“You know,” added Tom thoughtfully, “perhaps if we can come up with a good definition of what evolution is NOT, it may help us come up with a good definition of what it is.”

We agreed that this was a brilliant idea.

“I’m glad you brought that up.” Said Blue Beard, “Because I was thinking the same thing. Let me give a REALLY good example of what evolution is NOT.” He reached into his broad red coat and pulled out a roll of parchment, which he unrolled and read to us in his booming oratorical voice.

“NOT evolution: ***In the Beginning God Created the heavens and the earth***.” Carl groaned audibly, but Blue Beard kept on without pausing. “Over the course of the week, He created the various animal and plant kinds and declared that they would reproduce according to their kinds, meaning that Dogs would give rise to more dogs, and trees would give rise to more trees of a similar kind, and that tomato plants would never produce Moose, and worms would never make cabbages or wolves. In those created kinds were complex, diverse, and perfect genomes which could be shuffled and disseminated among the many generations to follow, allowing for a huge diversity within

the kinds, but while still maintaining the genetic boundaries of each kind. Thus you can have many different varieties of tomato, but never a moose kind of tomato."

"Who would even want to eat that?" I asked. "I have enough problems making a good salad without having to pick out hair and antlers."

Blue Beard agreed and then continued reading. "Due to rebellion by mankind, the world has been corrupted and the genomes of each created kind have faced entropy, resulting in harmful mutations, the arising of diseases and parasites and thorns, and occasional extinction of genetic lines due to the increasing genetic load."

"That was very nice, Blue Beard," I said.

"Thank you, lad," he said, striking my glass of root beer with his in celebration.

"So, to clarify," said Bill, "Biblical Creation is, and evolution is not:

1. Creation by an intelligent designer

2. A great deal of functional genetic information in the past gradually decaying over time into less functional genetic information.

3. A great deal of genetic information in the beginning of a kind being disseminated through subsequent generations so that genes are lost over time, not gained.

4. Animals reproducing only within the genetic boundaries of their kinds, and no kind ever giving rise to a different kind.

5. Animal kinds and even species remaining the same for very long periods of time.

6. Extinctions."

"Hold on," said Carl. "If you can't count extinctions as part of evolution, even though they happen during evolutionary history, then you can't count extinction as part of Creation, even though it might happen after creation."

"Carl's right," I said. "Both models include extinctions as part of their overall historical account of life on earth, but extinction itself isn't a central part of either."

"Did you just agree with me?" asked Carl, looking suspect.

"Well, you were right," I said. "We're not looking to win a fight here. We're looking to work together to find the truth." Once again Carl indicated his acceptance by eating another wing.

"What about Bill's fifth point," said Tom. "Plant and animal kinds, and even species, remaining the same for very long periods of time. Doesn't evolutionary history include stasis?"

"He's got you there," said Carl through a mouthful of chicken.

"In one sense, yes," I replied. "Like extinctions, stasis is part of both models. However, Creation has an expectation of stasis built into the defining characteristics. Things reproduce according to their kinds. But while evolutionary history might accommodate

stasis, it is the opposite of what evolution expects. Evolution expects change. Stasis is things NOT changing."

"But stasis isn't necessarily proof of your Creation model," said Carl.

"Not any one instance," I said. "But if the trend is primarily stasis, that would at least lean toward the creation model. If we find the same kinds of things in the fossils as we do today, that would lean toward the creation model, and not the evolutionary model. If we find things in the fossils which are drastically different than the things we see living today, or things which are clearly a member of two different kinds, like a cabbage wolf or a tomato moose, that would lean toward evolution."

"Then score one for evolution," exclaimed Carl. "Because the fossils show evolution for certain."

"We'll look at that in the future," I said. "In the meantime, here comes Wendy with our mountain of vital sustenance!"

A cheer went up from our table as the Nachos arrived, and we all fell into a thoughtful silence as we stuffed our faces with its cheesy goodness. Later on, darts would be thrown, and even a few songs would be sung. Science can only hold our minds for so long, before the jalapeños of friendship warms our hearts and they break forth into song and revelry.

Before we left, I encouraged Carl to do a little homework and come prepared with definitions of Evolution which we could compare to the list we had accepted tonight. He agreed and we went off on our way, to face another week of the American dream before next we would Nacho.

Defining Evolution 4: More Failures to Define

It was the kind of Thursday which had been so long that it felt like it was the following Thursday before all was said and done. The weather had chosen to exasperate the fact by doing what polite people call “misting.” This is when it’s not really raining, on account of there not being raindrops falling together in an organized fashion. Instead, there is a dense cloud all around, like fog and soup had a baby, and the baby won’t stop crying. An umbrella makes no difference, and the longer you are out in it, umbrella or not, everything you have on just gets progressively wetter, like your attire is fitted with a dial marked “Wet” which some wicked sprite keeps slowly turning toward eleven.

Due to the weather, Carl, Tom, Bill and myself had all run to get to Danny’s Bar, Grill and House of Rabblerousing and were thus more winded while we said our hellos than normal. Blue Beard showed up a bit later and smelled like wet dog, which he kind of does anyway.

We shook the mist off of ourselves and gathered around the table to our customary tall, frosty mugs of root beer, brought to us by our friendly and fashionable waitress Wendy, and since he was the only member of this soggy party not winded by a run from an office, Blue Beard opened the evening’s scientific discussions.

“Last time we was here, our little friend for the renting,” he said gesturing to me with his root beer, “had given us a few points which I think we all agreed was acceptable for a definition of Darwinian Evolution. Now I don’t wanna seem daft, but I was trying to share this with Mr. Stevens, my first mate, and I’m not sure I got it all right. Can you recap those for me, lad?”

“Sure thing,” I said.

1. Evolution is something to do with living things.
2. Evolution is something about life changing over time.
3. Evolution is something which is intended to explain the origin of different kinds of plants and animals.
4. Evolution tells a story where in all living things arose through past common ancestors until, far enough back in time, we reach a first universal common ancestor, making the history of life on earth a big tree of life. Or going forward in time, it explains how simple things like bacteria became worms which became fish which became lizards which became rodents which became primates which became humans.”

“Huh,” he said. “I guess old Stevens did get the gist after all. Good for me!” and he rewarded himself with a long drink from his mug.
“But I think we agreed,” said Tom, “that Evolution doesn’t exclude other things - like extinction events, or stasis.”
“That’s right, Tom.” I said. “This list is merely meant to whittle down the events to the ones which are in fact ***evolution happening***, not the only events which would ever happen.”
“And Carl,” said Bill, “you’re still ok with everything in those four points? Nothing strike you as stacking the deck against evolution being true?”
“It’s fine,” said Carl. “But like I said last week, I think we can leave the definitions to the professionals. I’ve got a list of definitions that I got from some biology textbooks which, while each a little different, still work according to this list and which I think are good enough for us.”
“Break it out then, Carl,” I said, saluting him with my root beer.
Carl took a sip of his frosty beverage and then pulled out a small spiral bound pad of paper from his coat. “Here’s something so basic they put it in the title of the textbook. **Evolution is, simply, Change over time.**” He tossed it on the table and looked at us. “Even you can’t disagree with that.”
“I’ll agree that evolution is about change over time,” I said, “but it’s nowhere near good enough for a clear definition. *EVERYTHING* changes over time. By this definition of the word, everything in the universe is evolving, which means the word just means, “Anything that ever happens to anything.” Which is fairly useless. All you are saying is, *“Things happen.”* Which is true, but hardly worth saying.”
“Remember those four points from last week,” said Bill. “Evolution has to be something to do with living things. And even if we saying ‘Living things changing over time,’ we’ve still not said anything with clarity.”

“Living things get hit by trucks and die all the time,” said Blue Beard, “which is a change, but not evolution. And not just squirrels. I’m just saying.”
Carl begrudgingly picked up his little notebook and looked at it once more. “OK, here’s a definition which is specific to living things. “**Evolution is Descent with Modification**.” Once again he tossed down his tiny notebook in victory, somehow expecting the conversation to end there. It’s like he hardly knows me sometimes.
“No, no,” I said. “*Modification* is far too vague a term to be useful here.”
“It means CHANGE,” said Carl, somewhat condescending.
“I know it means change,” I said, “but it doesn’t specify *what KIND* of change. Genetic decay causing the eventual extinction of the species is modification. That is hardly evolution since, as we discussed previously, dead things don’t reproduce.”
“Also,” said Bill, “with the exception of a few wee terrible beasties, ALL living things are different than their parents. But this again would, by definition, imply that EVERY LIVING THING which is NOT an exact clone of its parent is an example of evolution.”
“If you think the entire point of Darwinian Evolution,” said Blue Beard with a smirk, “is “Some things don’t clone themselves” then you need to pick up a copy of Darwin’s Origin of Species, and slap yourself repeatedly in the head with it.”
“Steady on, Captain,” I said.
“Wha’? T’was just a suggestion.”
“Can I make a suggestion?” asked Tom.
“As long as it doesn’t involve any slapping,” I said.
“Well, I’ve seen more than one article on social media suggesting that, **to reject Darwinian Evolution is to reject all of modern science**. So maybe Evolution is just another way of saying *Modern Science*. Or, I don’t know. *Biology*. Something like that?”
“Exactly what I said weeks ago!” interjected Carl. “Evolution is a big category of things which are observed in science.”
“One of the blogs I read was yours,” said Tom. “You said more than once that people who reject Darwinian Evolution are rejecting all of science.”
“And they are!” exclaimed Carl.
“Forgive my verbal eye roll, but allow me to cut to the chase,” I said, setting down my root beer so that my hands would be available for emphasis. “I know it’s popular for ignorant people to flaunt their ignorance by saying AMAZINGLY wrong things, but when someone tells me that “*to reject evolution is to reject ALL of modern science,*” I have to wonder if they speak any English at all.”
“Now you hang on one darned minute…” began Carl.
I ignored his protest and continued. “I have a hard time believing that someone who knows what most of those words mean would string them together in that order on purpose. What seems to be the most obvious flaw in this idea is that Darwin didn’t write about ANYTHING which we would really consider to be *Modern Science*. Just to name

a few examples, Darwin never wrote about Subatomic Particles, genetics, DNA, exoplanets, the internet, social media, hashtags, or Coke Zero. Did he?"
Carl glared and crossed his arms, but offered no reply, so I continued.
"On the other side of this coin, one may ask if they REALLY think that "Evolution" is a word which means *"All of modern science."* Because this would make some sense of their statement, but would be another example of someone using the word "evolution" ENTIRELY wrong. Either way, public school is not cranking out a series of winners if social media is any indication."
Tom chose to hide in his mug for a long swig, and Bill attempted to stifle a laugh, but Blue Beard made no attempt and laughed a bit longer and louder than even I thought was necessary.
"No offense, Carl." I said, smiling into my root beer.
"None taken," said Carl with eyes which were full of cuss words. Before those words found the path from his eyes to his lips I decided to give his mouth something else to do, so I asked him to share more of the definitions which he had found for us. He picked up his notebook, still glaring at me, but eventually his eyes fell down to the page and he read for us once more.
"This is quoted on *http://www.talkorigins.org/faqs/evolution-definition.html,"* he said.

> "..**evolution can be precisely defined as any change in the frequency of alleles within a gene pool from one generation to the next.**"
> *– Helena Curtis and N. Sue Barnes, Biology, 5th ed. 1989 Worth Publishers, p.974"*

"Evolution is any change in the frequency of alleles within a gene pool, from one generation to the next?" parroted Tom. "Hold on, remind me what an allele is."
"Why you daft boy," said Blue Beard laughing. "Thems those slippery snake like things that live in the ocean!"
"Those are *Eels*," said Bill. "The word is Alleles."
"Oh," said Blue Beard. "I thought they were both just mispronouncing it. So what's them?"
"**An allele is a variation on a gene,**" said Bill. He could tell by the look on Blue Beard's face that this didn't clear anything up for him, so he continued. "You know how DNA is the code for life- the written instructions on how to build living things?" Blue Beard nodded to indicate that he did. "And sections of DNA which code for a particular feature, say, the color of your eyes, are called genes?" Blue Beard nodded again. "Well a gene can have variations for the same feature. For example, in any person there are two genes for eye color. Those genes might be the same, such as if you only have the gene for brown eyes. However, there exist a variety of possible genes for eye color which can make blue eyes, or green, or hazel eyes. All of those genes for the same trait, in this case eye color, are alleles, or variations for the same trait."

“So why can’t ya just call them variations?” asked Blue Beard, somewhat annoyed. “Whys science always gots to invent new words so no one knows what theys taking about? Anyways, tell me again what that definition was?”
“Evolution,” said Tom, “is any change in the frequency of alleles within a gene pool, from one generation to the next.”
“So evolution, says they, is a change in the frequency of gene variations.” Blue Beard thoughtfully slurped some root beer. “And by frequency they just mean… frequency? Like, how many are there from one headcount to the next?”
“Basically,” said Carl.
“So this whole blessed definition is just about math? Counting genes?” said Blue Beard.
“No,” said Carl. “It’s about how the part of a population carrying one allele versus another will change over time. It’s how populations evolve.”
“Which is just math,” said Blue Beard. “When you say a population has evolved, you’re saying there has been a change in allele frequency.”
“That’s right,” said Carl.
“And when you say there’s been a change in allele frequency,” said Blue Beard, “you mean there has been a change of ***how many members*** of that population have one gene compared to another.”
“Well… yes,” said Carl. The look on his face seemed to indicate that he had not thought about it in those terms before.
“Maybe we need an example,” suggested Tom. “To illustrate what all of this means.”
“I’ve got one,” said Bill, “which will no doubt be in any of your biology textbooks. They’re called **Peppered Moths**.”
Carl pulled out a middle school text book and flipped for a moment until he found the page he was looking for. “Here they are,” he said, showing us the illustration. “Peppered moths come in two varieties. One is primarily charcoal in color, the other a primarily white color.”
“They should be called Salt and Pepper Moths,” said Blue Beard.
“So these here moths,” explained Bill, “live among trees which are fairly light in color. In any average population, the light moths make up 95% of the population, because they can hide real easy on those trees, you see, and the dark, moths make up only 5% of the population on account of not being able to hide on the trees and the birds eat them and they die.”
“I think I get it,” said Tom. “95% light moths and 5% dark moths, mainly because of camouflage options.”
“That’s right!” sad Bill. “Until the industrial revolution. The factories started belching out smoke. BELCH! Blahhhhhh! And the trees get all covered with soot and dirty and get much darker. This is wonderful for the dark moths. They are all, ‘honey, look! We can hide from the birds just by hanging out in the open!’ and the light moths are all, ‘I say!

What a poor spot of luck for us. We're going to die, you see.' And the birds eat the light colored moths until 95% of the population is dark moths, and only 5% of the population is light moths. And that, jack, is a change in allele frequency. Deal with it."

This presentation of information was so smashingly delivered that we all gave a polite round of applause before we even resumed the conversation. When we did, it was Blue Beard. "So the population changed in terms of which version of moth was the most?"
"That's the whole truth," said Bill.
"And this is a change in allele frequency?"
"In a nutshell," said Carl, "that's a great and literally textbook example."
"So, when the story began," said Blue Beard, "there was light and dark moths. When the story ended, there was light and dark moths."
"Well, yes," said Carl, "but in different amounts. Er, percentages of the total population."
"Am I amiss, or is this merely a change in numbers?" said Blue Beard inquisitively.
"Blue Beard is right," I said. "This is another popular failure. A change in allele frequency is NOT an evolutionary change because it is not a ***genetic*** change. It's a ***statistical*** change."
"It's a change in the genes!" said Carl. "It's a change in the gene frequency."
"No," I replied. "It's not a change in the genes, it's a change in the statistics. That's why it's called a change in allele *FREQUENCY* and not a change in ALLELES. The population didn't gain any new genetic information. Just like Blue Beard pointed out- light and dark moths when we started, and light and dark moths when we ended. There's not even a new variety of moth."
"Yeah, Carl," said Blue Beard somewhat agitated. "I thought we was supposed to be explaining where new kinds of things come from in the first place. You want to tell us how changing how many peppered moths you got explains where peppered moths come from in the first place?"
"Well, it's not entirely meant to…" began Carl, looking a little sheepish.

“Then why did you bring it up you daft bilge-rat!” shouted Blue Beard. “Didn’t we say not but a few minutes ago that this Evolution business is supposed to explain the ***origin*** of plant and animal kinds? And you go bringing up ***census information***?”
“It’s a very popular definition!” answered Carl. “It’s in biology textbooks! Perhaps you guys simply don’t understand.”
“Carl,” said Bill calmly. “Does or does not your textbook use the peppered moths as an example of a change in allele frequency?”
“It does.”
“And did or did not I explain accurately what the book says about the peppered moths?”
“For the most part. I mean, the story doesn’t really end there. The clean air act of the 1960s reduced the soot output of those factories until the trees returned to their original color, and then the population of the peppered moths returned to their original percentages.” Carl flipped through the pages in his textbook as if he was looking for his next thought, but it seemed as if he never found it. “So, there was an additional change in allele frequency,” he added with a shrug.
“So is or is not Blue Beard correct,” continued Bill, “when he says there was no new varieties of moth created in these events?”
“Well, yes. He is correct.”
“And is he not also correct that this is in fact, census information.”
“Well it’s not.. I mean.. I wouldn’t call it that. But, yes.”
“So, Carl,” said Bill smoothly, “will a change in allele frequency ever create new genes that did not previously exist?”
“Not by itself, no.” Carl admitted.
“Then I think we can agree that this definition is insufficient,” said Bill. “Would you not agree, Carl?”
Carl went back into flipping through his textbook and offered no answer.
“I’d agree,” said Tom. “You can’t make anything new merely by comparing numbers. That would be like trying to make money by balancing your checkbook.”
“Good analogy, Tom,” I said.
“Thanks.” Tom searched his own briefcase and pulled out a sheet of paper. “I found something which I think might work,” he said. “This is from
http://www.livescience.com/474-controversy-evolution-works.html”
He took a sip of root beer and read it aloud to us.

> *“**The theory of evolution by natural selection, first formulated in Darwin’s book “On the Origin of Species” in 1859, is the process by which organisms change over time as a result of changes in heritable physical or behavioral traits.**”*

He paused again for some root beer and continued reading.

*"**The theory has two main points***, *said Brian Richmond, curator of human origins at the American Museum of Natural History in New York City. "**All life on Earth is connected and related to each other," and this diversity of life is a product of "modifications of populations by natural selection, where some traits were favored in an environment over others**,"* he said."

Tom looked up at us and said, "Well? What do you guys think?"

"The first part," said Bill, "said that evolution is the process by which organisms change over time as a result of…"

"Changes in heritable physical or behavioral traits," read Tom.

"You can't argue with that," said Carl.

"Actually, I can," I said. "If the changes are merely physical traits, those can be the result of shuffling existing genes, or even losing some. This only works if it specifies the *creation of new genes.*"

"Maybe it does mean that," Carl said.

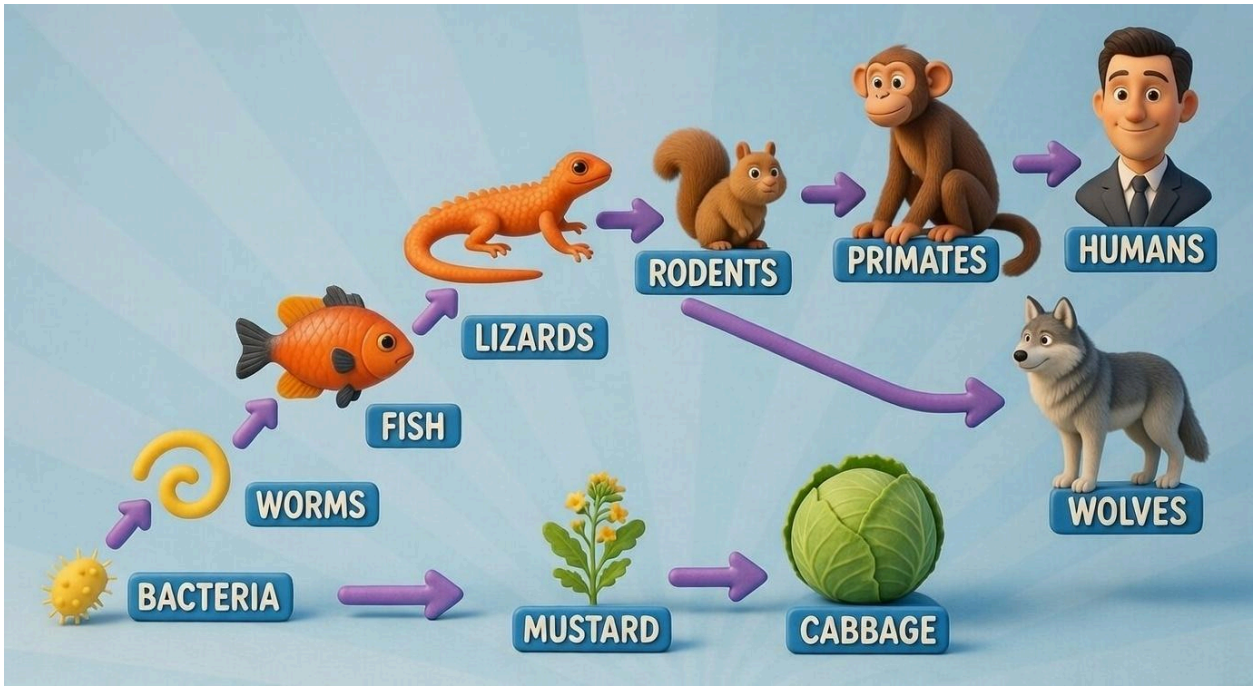
"But maybe it doesn't," I replied. "That is my principle complaint about most of these definitions. They are far too vague. And as long as something can mean two totally different things, it is not good enough."

"What about the other two points?" asked Tom. "First, that all life on Earth is connected and related to each other, and second that the diversity of life is a product of "modifications of populations by natural selection, where some traits were favored in an environment over others."

"First part yes, second part no," said Blue Beard abruptly before finishing off his root beer.

"Why?" demanded Carl.

“First part says all life is connected,” said Blue Beard. “Like them trees says. And the second fails for the same reason your moths failed. Nothing’s been gained.”



“What do you mean?” asked Tom.

“It says,” began Blue Beard slowly, biting the words as he spoke, “some traits are *favored* in an environment *over others*.”

“Yes?”

Blue Beard raised an eyebrow. “In order to be favored over other traits, a traits has to exist, yes?”

“Oh, well, yes,” said Tom.

“Then we’re talking about the fisticuffs to the death of two traits, or I guess, genes for traits, which exist in the same population.”

“That’s right.”

“Then we’re ***not*** talking about how those genes came to exist in the first place. We are talking about the fight to the finish what kills off one of them, leaving the other. Right?”

“Oh,” said Tom. “You’re right. It doesn’t have anything to do with creating new traits or new genes.”

“You can’t grow the Darwinian Tree of Life” said Bill, putting a fine point on it, “by reducing the number of genes or the number of varieties that exist in a population.”

“Still,” said Carl weakly. “It’s got that tree part. At the beginning.”

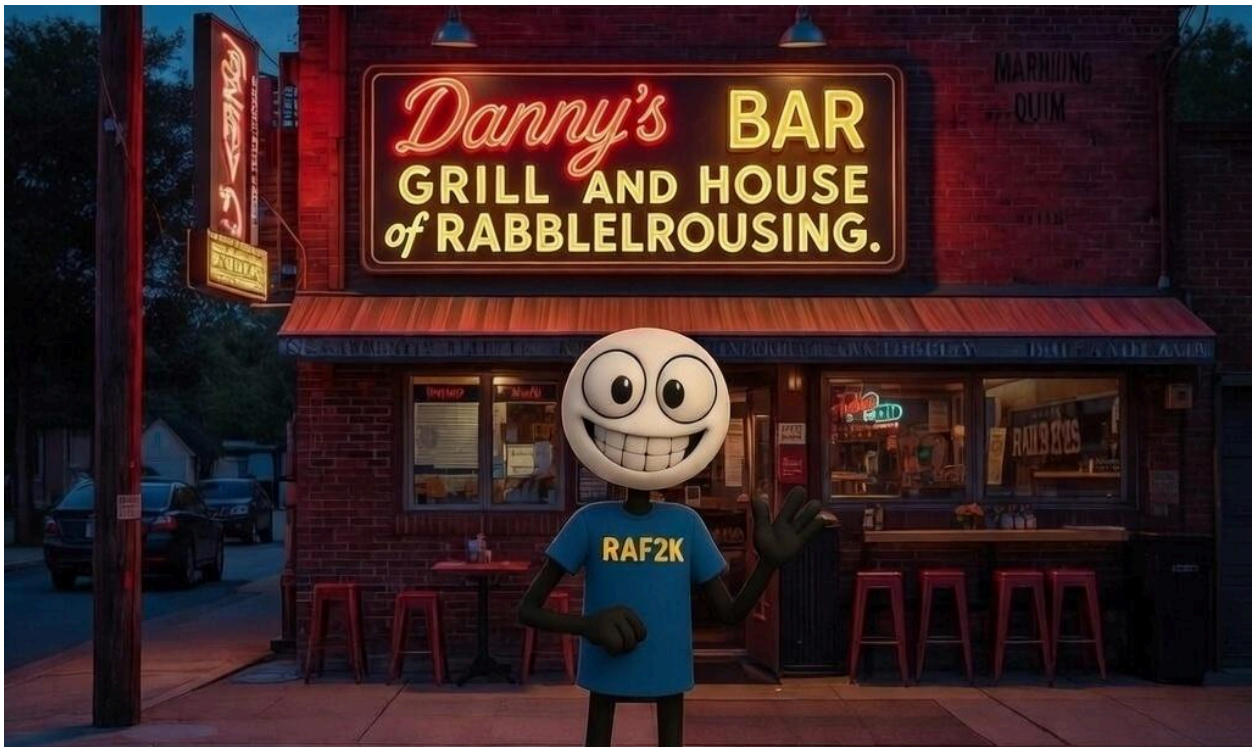
“Yes, and that part would work with a little clarification,” I said.

“You’re as finicky as a cat,” said Carl with disdain.

“I just like my definitions to be clear enough to differentiate two words from each other.”

“So what are you saying evolution is, smart guy?” demanded Carl. “You want to come up with something better than all of the textbook writers and biologists of the past century?”
“I’d be happy to,” I said. “But I need a little more time, and we have a giant pile of Nachos coming this way.”
As Wendy approached with the huge plate of goodness, we agreed that we would continue this particular discussion the following week. I had a little work to do, but I was confident that I was going to provide the world with its first completely clear and actually useful definition of Darwinian Evolution. Hope swelled in my heart - although it may have been the cheese sauce and jalapenos. Those feel very much the same to me.

Defining Evolution 5: A Very Useful Definition



“Another Thursday, another enormous pile of Nachos!” That’s my motto. At least, it’s one of my mottos. I’ve also been known to say, “You can have me pretty or early, but not both,” or “I’ve never met a cheese I didn’t like,” and on rare occasions, “Get it BEFORE it dries!”

I had come to the sacred meeting grounds of mighty men of valor which is known as Danny’s Bar, Grill, and House of Rabblerousing to meet my friends after our nine to fives. As per our custom, we gathered to drink root beers, complain about our bosses seeming lack of grey cells, and brag about the important memos we had read, epic meetings we were forced to attend, and unstoppable onslaught of coffee we had consumed.

On any given Thursday, the tales told by myself and my friends Bill, Carl, Tom, and Captain Blue Beard would have expanded to include the latest science fiction films, young adult novels, or action packed video games experienced, but we had wound up in a series of talks about science. Specifically, Carl and I had gotten our teeth and claws all set for a fisticuffs about the validity of Darwinian Evolution, when our medically trained friend, Bill, had suggested that we first make an effort to define what the thing is. While a lot of textbooks have suggestions, most if not all of them are pitiful for a host of reasons. Just a day or so ago I had read a textbook definition which said **“Evolution:**

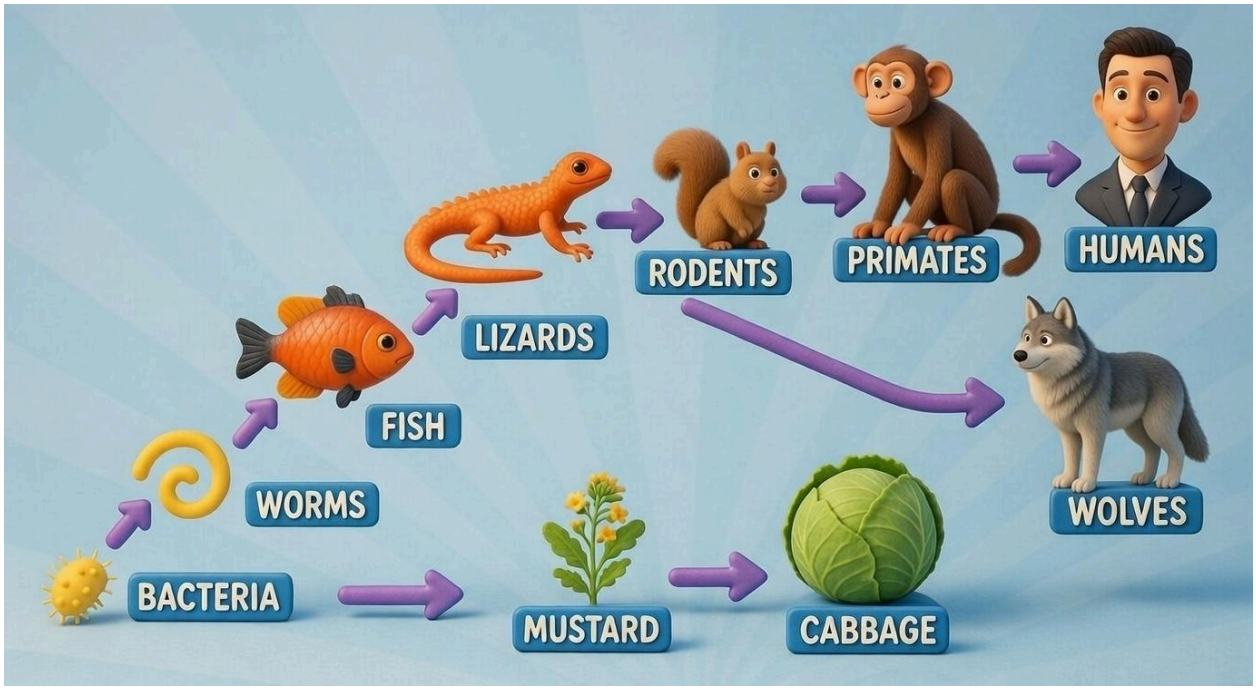
When things change, or evolve, over time." Our public school kids are being taught from books which tell them that ***evolution is when things evolve***, and we wonder why they don't take their education seriously. I suspect this may explain the rampant drug use among today's youth, but I digress.

"When last we left," I said to my comrades, frosty mug of root beer in hand, "our good friend Carl had suggested that I come up with a definition which was superior to that offered by the textbooks and web sites we had examined and pooh-poohed. My friends," I said, root beer held to the light, "I have done just so!"

"Here, here!" shouted Blue Beard. "A gentleman and a scholar at a very reasonable hourly rate."

"I gotta hear this," muttered Carl as he drank.

"The story is, in a very condensed nutshell," I began, "the story of how *(whatever else might happen during the same time span)* bacteria gained the genes to become worms which gained the genes to become fish which gained the genes to become lizards which gained the genes to become rodents which gained the genes to become primates which gained the genes to become you - as we have seen illustrated in the Darwinian Tree of Life. The rodents which became you also branched off in another direction and became wolves. The bacteria which became you also branched off in a different direction and became cabbages.



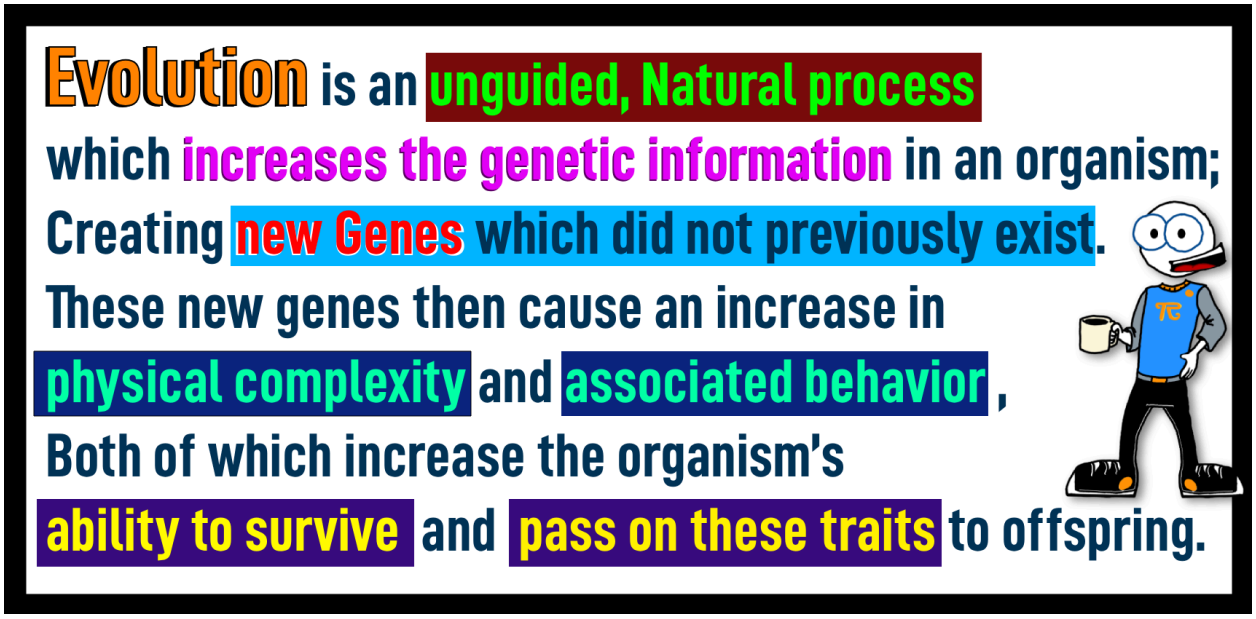
"Thus, this growth of the Darwinian tree of life which resulted in you and wolves and cabbages started with some bacteria which gained the genes to become something more than bacteria, and through several different branches over long periods of time,

those bacteria gained the genes to become you, or wolves, or cabbages, or anything else on earth."
"We've been through this," Carl reminded us. "Get on with it."
"Yes, thank you Carl. I have developed my own definition which I think explains what evolution must be if it is to be given credit for the evolutionary story of the history of life on earth. It goes like this." I cleared my throat and took out a 3 x 5 note card which I had prepared for the occasion.

"My definition, By Rent-A-Friend 2000, copyright RAFMinistries, Trademark me."
"Get on with it!" said Carl again, this time joined by the others in chorus.
"Right. Here it is.

> ***Evolution is an unguided, Natural process***
> ***which increases the genetic information in an organism;***
> ***Creating new Genes which did not previously exist.***
> ***These new genes then cause an increase in physical complexity and associated behavior,***
> ***Both of which increase the organism's ability to survive***
> ***and pass on these traits to offspring."***

I looked at their faces, beaming with pride.
"Isn't that wonderful?" I exclaimed. "It says everything a good definition needs to, and without the use of expert level specifics. I know SOME of you didn't think that it could be done." I nodded to Carl, who rolled his eyes in return.
"I want you all to embrace this definition. Give it a BIG old hug! And when you use it, let people know where it came from. And also deposit $15 into my PayPal account to cover royalties and my licensing fee."



"All right," said Carl. "Enough aggrandizing. Let's talk about it. I suspect it fails somehow."

"I thought you might say that," I said, reaching into my pocket, "so I made you each your own note card with my definition on it." I distributed the note cards with the proud glow a new father might have as he passed out photos of his new baby, provided his baby was a definition for a scientific model.

"I've got a question," said Tom thoughtfully, his eyes drifting over the note card he held. "Why does it have to be an ***unguided, natural process***?"

"Experience, my dear boy," I said. "I had one gentleman approach me in person to explain that evolution is an observed fact of science. I asked him to defend this statement, and he began telling me what geneticists have accomplished with gene splicing in the lab. I stopped him right there because it does not MATTER what scientists can do in the lab when we are talking about a defense of evolution. Would you agree, Bill?"

I like to defer to Bill in matters of biology since he is an actual Doctor. Or maybe he plays one on TV. Either way, he sounds so awfully smart, and yet whimsical.

"I would agree," he said. "What scientists do in the lab is no more an example of evolution than Mt Rushmore is an example of erosion. Mt Rushmore tells us a lot about the physical structure of that rock, see, but it says nothing about erosion. Erosion would NEVER turn a mountainside into the head of a former US president. What scientists can do with DNA in a lab tells us about the chemical properties of DNA, and the cleverness of those scientists, but it says nothing about how the DNA came to exist or what it will do when left to nature."

"But why," asked Tom, "does it have to be purely unguided? Don't a lot of people think God used evolution to make different life forms?"

“While there are many who would try to blend Creation, Intelligent Design and Evolution together into a mythical smoothie of pseudoscience,” I agreed, “I think the rest of us would stop them before they hit that Puree button, because it simply cannot be done. What happens is, you get a worldview wherein God performs a countless number of small miracles to turn bacteria into wolves and cabbages and everything in between using non miraculous means. A miracle by natural means is a contradiction in terms, so you wind up saying nothing.”
“Let us keep in mind,” exclaimed Blue Beard, “that Darwin claimed to show the Origin of Species by means of Natural Selection, not by means of Divine Intervention!” He laughed at his own cleverness and swallowed another mouthful of root beer.
“As we seem to be taking our time to define our terms,” said Tom, “maybe we could help me out by explaining ***Natural Selection***? It sounds as natural and unguided as anything can be, but maybe I’ve forgotten what it is?”
“An excellent suggestion!” I replied. “Imagine if you will, a population of little worms of different colors.”

“OK,” said Tom. “Why are they different colors?”
“In any population,” I explained, “there are little differences, which can be anything from size to color to ability and beyond. It’s these differences that allow Nature to select from among them.”
“Yes,” added Carl, “the variation within the population can be anything, but in essence, it is a variation which makes those with a certain variation more capable of surviving, and others less capable when faced with an environmental stressor, that is anything which might make it harder for some to survive.”
“Like if they got crabs,” interjected Blue Beard.
“Who?” asked Carl. “The worms?”
“Sure!” our pirate friend replied. “Crabs might eat them worms, mightn't they?”

“I suppose…” Carl began.

“And on account of being different colors,” Blue Beard continued, “some of them worms is harder to see than the others.”

“Like camouflage?” said Tom.

“That’s the idea!” said Blue Beard. “Capable of hiding in plain sight they is. And so the others gets eaten while he don’t.”

“Because that one worm that matches the environment is more fit to survive,” Carl explained, “they are what we call ‘The Fittest.’ His offspring become the majority of the population because the less fit die off and aren’t around to reproduce.”

Population With Variations

Environmental Stressor

Population After Nature Selects the Fittest

“Nature selects certain variations to survive,” Carl described to Tom, “and others not to. That is Natural Selection in a nutshell.”

“That’s a good description,” I said, “but there’s one more factor to keep in mind. For evolution to be Darwinian, Evolution must claim, as Darwin and all of his disciples since have claimed, that the changes which happen over time are unguided and natural changes - nature left to nature doing the selection without any intelligent help. Carl, would you agree?”

“I think I do,” he said. “My understanding of Evolution doesn’t require any miraculous interventions. Evolution is intended to be a description of how nature behaves, just as gravity is a description of how matter behaves. If nothing else, I say this is a feature which separates Evolution from Creation. Evolution doesn’t need any miracles.”

“Oh, don’t you now?” said Blue Beard with enthusiasm. “Then where did the first living cell come from, I wonder? Did some DNA write itself and then build a cell to live in, or did a cell fall together by accident and then write some DNA to govern itself, like a tiny Continental Congress?”

“Evolution doesn’t need to explain the origin of the first life,” Carl retorted bitterly. “Evolution is what happens after there is life reproducing.”

“Oh, a fine time to end your intellectual responsibility,” laughed our pirate friend. “So rain on rocks somehow violates every known law of physics and chemistry and probability to make the first living cell, and you can close your eyes and be content to say, ‘Well, it MUST have happened!’ And once it did, then Evolution could get started. AFTER the miracle.”

“The arrival of the first cell is a mystery to science,” admitted Carl, “but doesn’t require any miracles. And again, Evolution is something which only happens to living things which is why we call it *descent with modification*. When the primordial soup somehow combined the right chemicals to get a self replicating system, the parts weren’t evolving, they were assembling according to some laws of chemistry, though maybe some we don’t yet understand.”

“Actually, Carl is right,” I said. The look on Carl’s face was something of astonishment as he is simply not used to me siding with him, especially in these matters. He looked as if he was about to have a serious bout of indigestion.

“About what?” demanded our blue tinted pirate friend.

“About evolution only happening to living things.” I said. “In some sense, evolution can’t happen to things that don’t reproduce - at least Darwinian Evolution can’t. It can only happen to living things that reproduce, and thus the origin of the first living things is not a question of Darwinian evolution.”

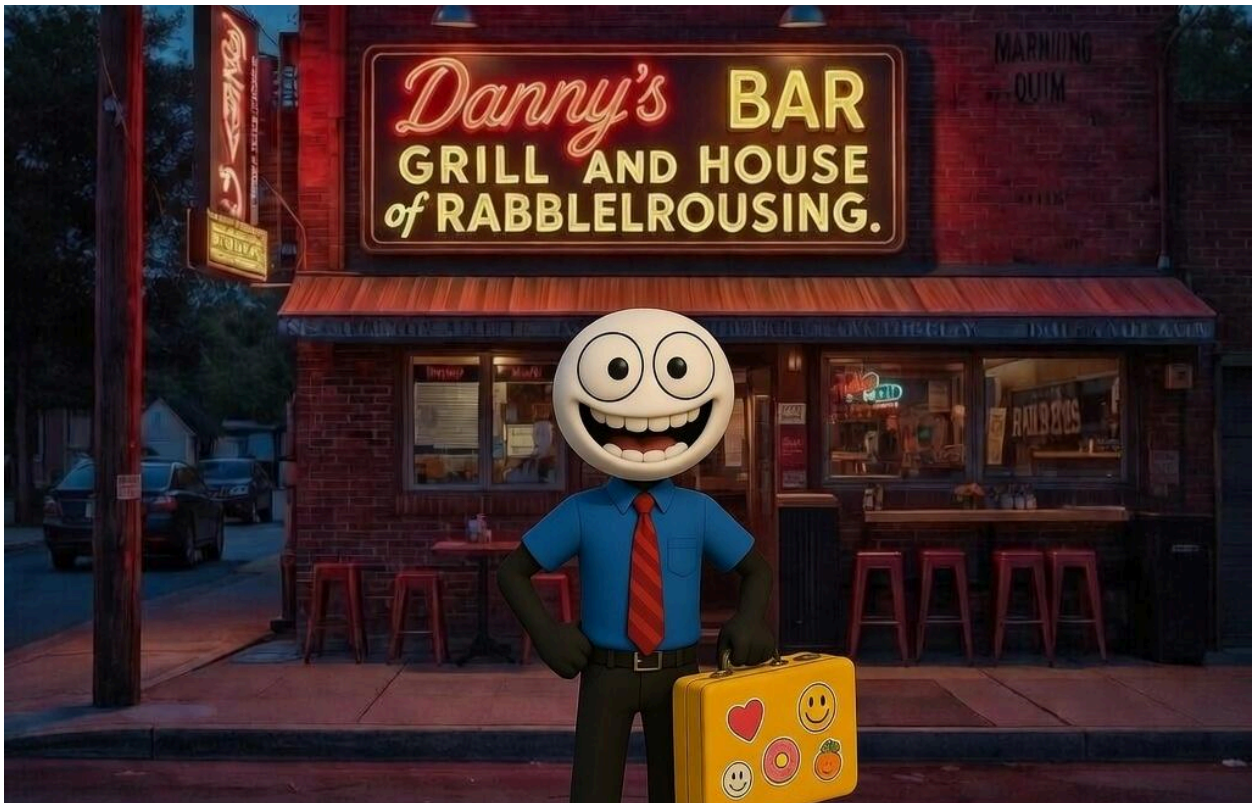
“Thank you,” said Carl.

“On the other hand, Blue Beard is right, Carl. All of these textbooks do put forth some kind of origin story, however vague, because the evolution of life on earth had to start somewhere. You need a base to the Tree of Life or there would never have been a tree

to follow. But even the simplest cell is so complex that the accidental coming together of such a complex and information rich system is…" I searched for the word.
"Stupid!" shouted Blue Beard heartily.
"Not the word I was looking for," I told him. "But mathematically it is impossible."
"Well, it must have happened somehow," said Carl stubbornly, "and someday science will be able to explain it."
"That," I admitted, "is a statement of great faith."
Carl bristled at the word 'faith.' He prefers to use that word as an insult against me, and hates it when I find these opportunities to point out that he has faith of his own.
"Your religion," I explained, "is based on the faith that, someday, future science will explain what modern science has already shown to be impossible. My faith requires me to believe an all powerful super intelligence can make machines and write code. Which is something Tom can do, can't you?"
"Oh, well, yes," said Tom. "But of course, we don't write code that is anything nearly as complex as DNA. DNA has codes within codes and even sections which contain multiple codes in different directions…" he noticed Carl's face getting redder and redder and chose to get back on topic. "Anyway, so, why does it have to be unguided? Why not just accept any change over time? Why can't any selection in Nature be Darwinian Evolution?"
"For one instance," replied Bill, "the changes made by animal breeders and farmers as they choose certain traits *(Called Artificial Selection)* is not evolution because it is intellectually guided, and caused by a person with a goal in mind. You understand? This is what I was saying about DNA. It's interesting to see what scientists can do with DNA when they have tools and goals that nature does not, but that doesn't show us what Nature, left to itself, can or would do. Nature does not have a mind or any goals, you see. All of the mechanisms of evolution are meant to be purely accidental by products of ***nature plus time***. If the Darwinian Tree and its associated timeline is accepted, it means there was no one making choices for the first 99.99% of the history of life on earth. Just natural, unguided accidents."
"If Natural Selection could talk," I interjected, "it would constantly be parroting the phrase of reflective introspection made famous by 1990's philosopher, Steven Quincy Urkel; ***"Oops. Did I do that?"***
"If you reject the idea that evolution is supposed to be an ***unguided and natural*** process," I said, "then you are not talking about Darwinian evolution. Whatever you are talking about has a different name, and I suggest you surf over to Google and find out what it is. When you've found it, make yourself a fruit smoothie. You've earned it."
"I'll have a smoothie for lunch tomorrow," said Tom. "But right now the mountain of nachos is coming this way!"
And so it was.

We tucked into our pile of cheese, chips, meat, love, sunshine, joy, and metaphysical inner peace for a few moments in silence. I had suspected that we would return to the discussion presently, but before that could happen, someone mentioned the new Star Wars trailer, and that got us off and running on different space related topics until our time all too quickly ran out. Thankfully, I knew not to worry about it. My motto is, “There’s always another Thursday.” At least, it is on Thursday nights after the nachos are gone.

Defining Evolution 6: Creating New Genes

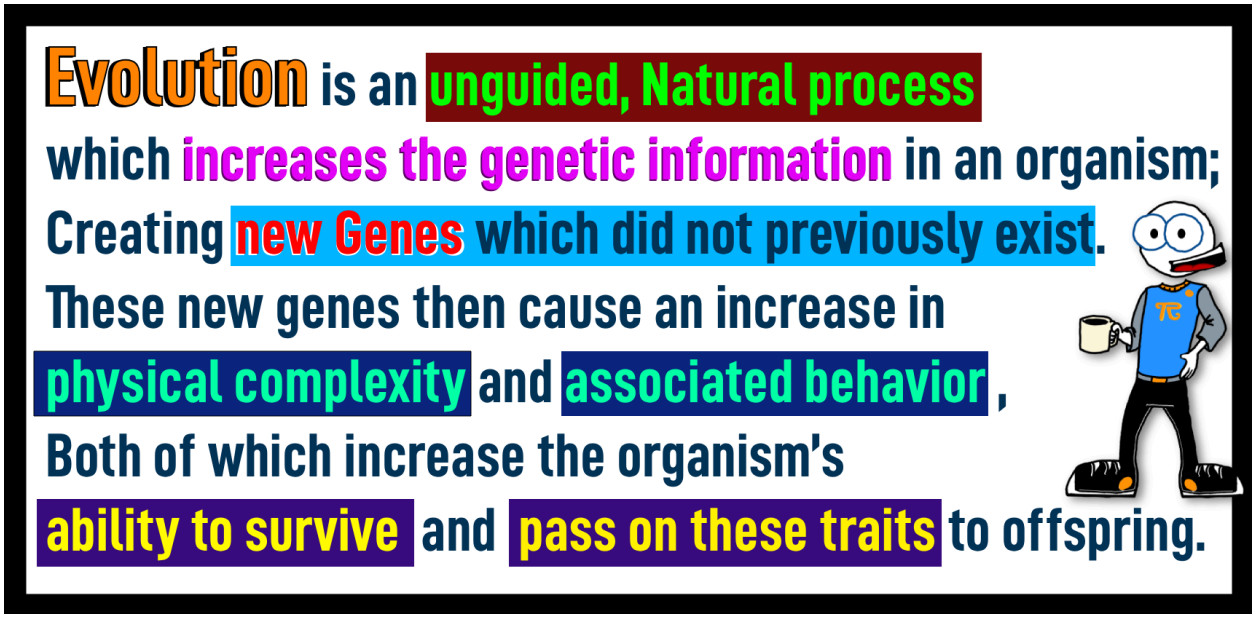


Sweet relief! Another Thursday in the salt mines has passed and that means it is time for me to conduct the transportation of my person across the face of our planet toward the blessed grounds of Danny's Bar, Grill, and House of Rabblerousing. It is on each Thursday night that my friends and I meet to join forces against a plate of Nachos so large that the "N" in Nachos must be capitalized. It is rare that our group has not waved the white flag, as it were, to the Nachos. Also, if too many people order one on the same night, it can adversely affect the weather for days to follow. It's not just the jalapenos that make those Nachos great - it's also the slight taste of danger.

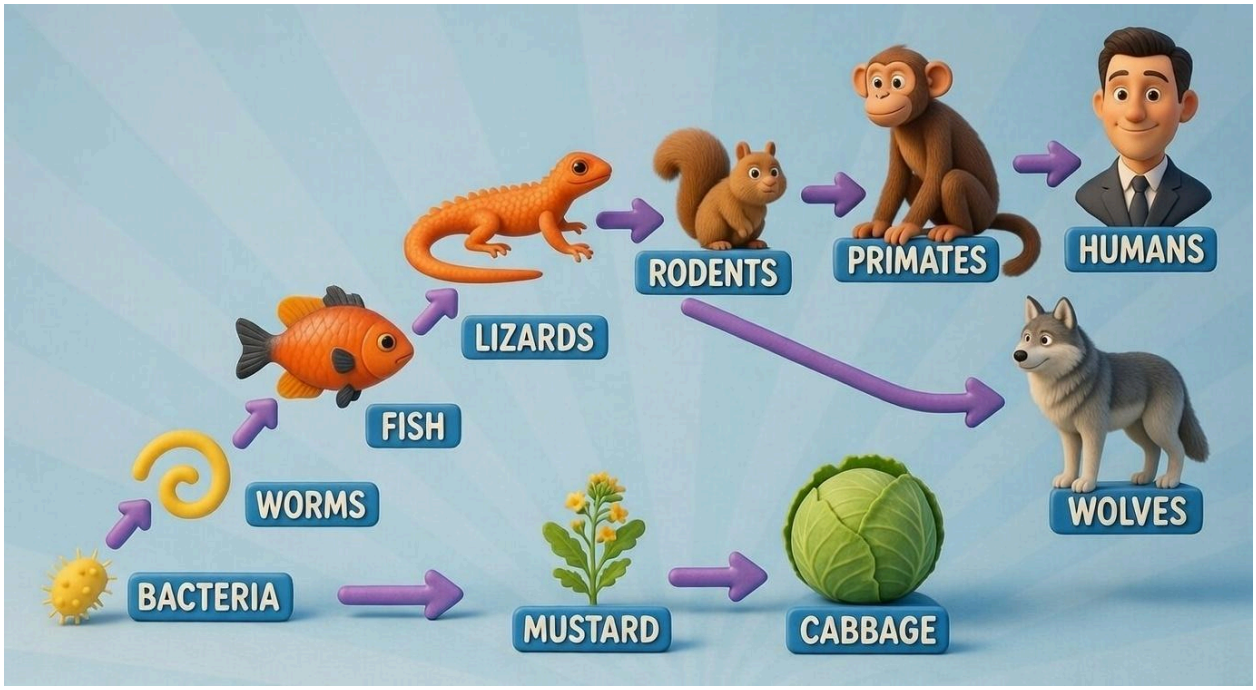
The friends with whom I meet are Carl, Tom, Blue Beard, and Bill. As a Young Earth Creationist who rejects Darwinian Evolution on both Scriptural and scientific grounds, I frequently have people coming to tell me how dumb I am for rejecting evolution which they insist is a fact of science. Carl is one such person. But when asked to define what they mean by "evolution" these people (including Carl) seem to have no idea what the word means, and often get angry at me for asking them to define it. But I would not be a Rent-A-Friend if I left these poor souls in need. Thus, in order to help out everyone in the western world, I have created what might be the world's first useful definition for "Evolution." It goes like this:

Evolution is an unguided, Natural process which increases the genetic information in an organism; Creating new Genes which did not previously exist. These new genes then cause an increase in physical complexity and associated behavior, Both of which increase the organism's ability to survive and pass on these traits to offspring.

On this particular night, we would discuss why this definition says "**which increases the genetic information in an organism; Creating new Genes which did not previously exist**."



My friends had just received their first of many root beers of the night from our lovely red haired waitress, Wendy, and as they drank deep the sweet libations, I took the opportunity to remind them of the conversation as it stood per last week's shallow dive into my wonderful and groundbreaking definition. "To begin with," I said to my friends around the round table, "we must remember the story evolution intends to tell. It begins with bacteria *(And we'll just be glossing over the obvious question of how we got something as complex and full of information as a self replicating bacteria)* and the bacteria population somehow gained the genes to become worms, and the worm population somehow gained the genes to become fish, and the fish population somehow gained the genes to become lizards, which became rodents, which became primates which became bloggers, one of which became a Rent-A-Friend."



“A Gentleman and a scholar at a very reasonable hourly rate,” said Blue Beard.

“I think you said that last week,” said Tom.

“Maybe so, but it were worth saying again.”

“Every step along the way,” I continued, “you will see the need for new genetic information.”

“Do we?” asked Carl. “I don’t know about that. Why does there need to be NEW genetic information in every step?”

“This is why I reminded us of the tree,” I said, producing one of the illustrations of the Evolutionary Tree of life. “We’re talking about the steps which take one kind to another. We’re not talking about a variety of dog giving rise to another variety of dog.”

“Why not? When wolves disseminated into four hundred kinds of pet shop dogs, that was evolution happening,” Carl insisted.

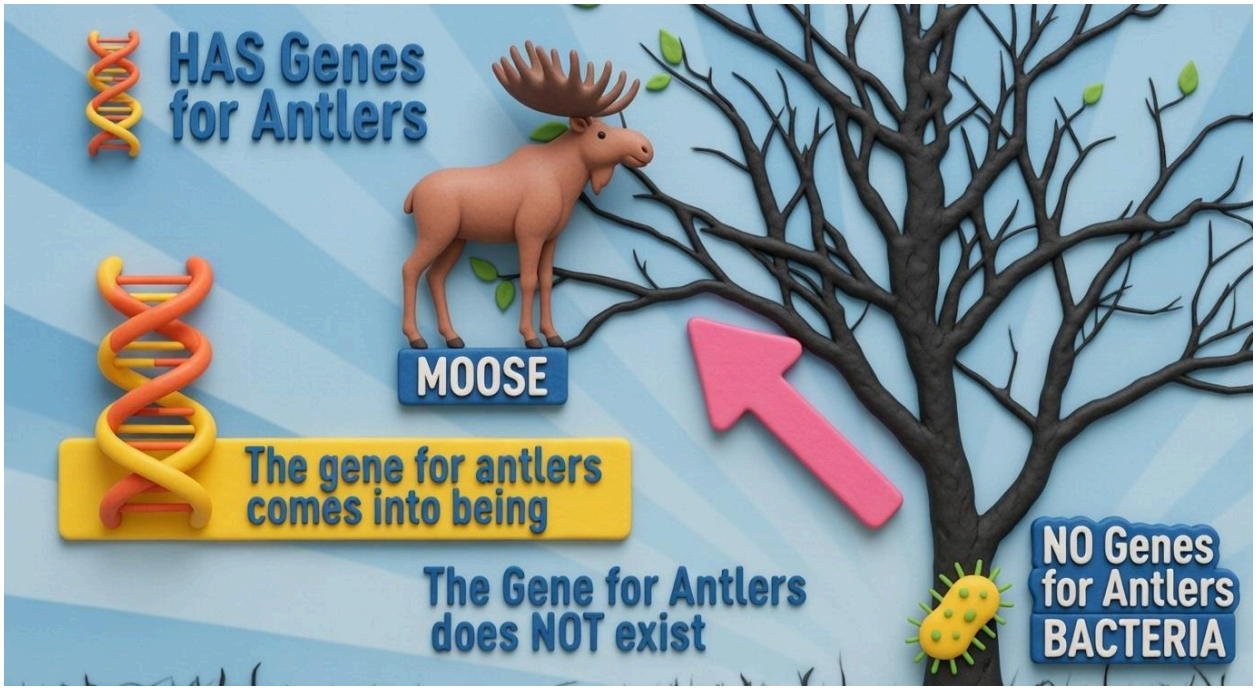
“We discussed this a few weeks ago,” Bill reminded Carl. “We agreed that since the evolutionary story is told in the tree of life, that we would base the definition on that tree. Also, Rent-A-Friend explained how the dissemination of wolves into dogs is basically dogs into other dogs, which is part of the Creation model.”

“And if yer evolution model doesn’t differ from ‘is Creation model,” added Blue Beard, “then what good is it?”

“So you’re focusing on the transitions between kinds up the tree,” asked Tom, “because it’s a primary difference between the evolution model and the creation model?”

“Not only because it differentiates them,” I replied, “but because it is a *necessary* part of the Evolution story. If Darwinian Evolution only allows dogs to make more dogs and

doesn't allow fish to make lizards which make rodents which make dogs, then it's not going to make the tree of life which supposes to be the history of life on earth."
"That makes sense to me," said Tom. And since Carl offered no further argument on the point, I went on.
"A bacteria does not have the genes it takes to make a worm," I replied. "A worm does not have the genes it takes to make a fish. A fish does not have the genes it takes to make a lizard. Etc. Each new KIND takes NEW genes that DID NOT EXIST in the previous kind."



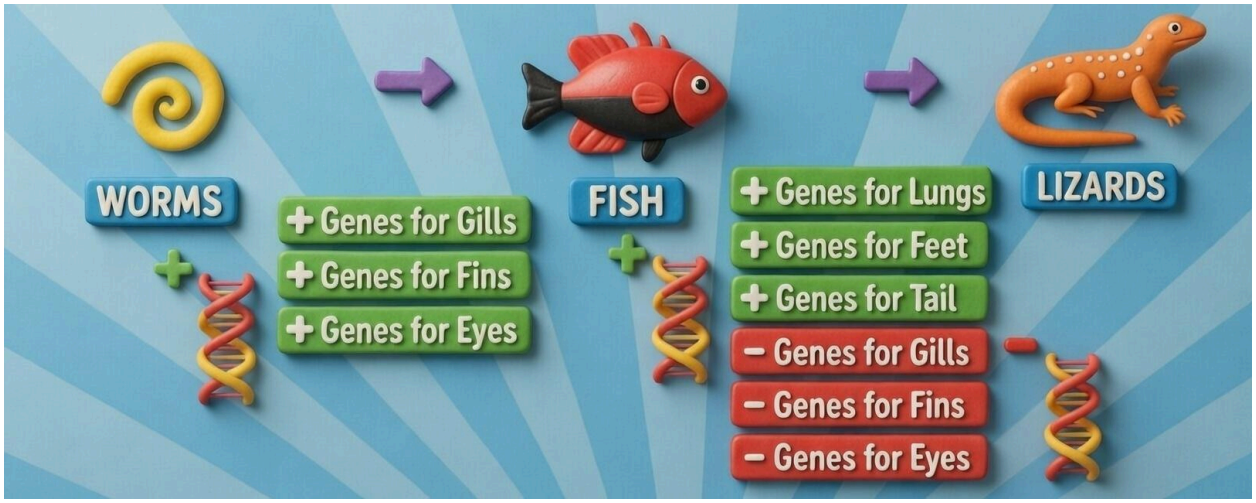
"I think the point Rent-A-Friend is making," said Bill, "is that there are only so many options.

1. **The genes to make a fish always existed in the bacteria and the worms, so the arisal of fish doesn't demand new genes to come into existence.**
2. **The genes to make a fish did NOT exist in bacteria, so somewhere along the line those genes needed to come into being.**

"If you choose option one," he continued, "then you are literally saying that bacteria and worms all had the genes to make eyes and gills and fins and swim bladders, and all of the other parts required to make a fish. Scientifically, you see, this concept is what ichthyologists and geneticists would refer to as "Stupid." Neither bacteria nor worms have the genes required to make gills or fins or other fish parts. Similarly, fish do not have the genes to make lungs and legs and toes and other lizard parts."
"If you choose option 2," said Blue Beard with enthusiasm, "because, as you recall, option 1 is Stupid, then ya must agree tha' the genome of the previous kind of life must have genes added to it. S'basic math."

“Now, to clarify,” I said, anticipating what the look on Carl’s face probably meant, “there may be genes lost. Fish have gills, and thus the genes to make them. Lizards do not. So, the story must assume that the genes for gills can get lost along the way. **This definition is not arguing that the TOTAL AMOUNT of DNA must increase at every step up the tree, nor the total number of chromosomes**.”

“I think that sounds fair,” added Bill. “We do not have to believe that fish must have more DNA nucleotide base pairs than worms. We must only believe that, **in order for worms to evolve into fish, they have to have the genes for fish parts added to their total collection of DNA**.”



“Exactly,” I said. “**THIS is what is meant by *increases the genetic information in an organism*, not that they have more numerically, but that they have gained genes which their ancestors did not have, or as I said, “new Genes which did not previously exist**. And to clarify further, if the genes for fins get changed into the genes for legs, such that the gaining of a new gene and the losing of an old gene is the exact same process, the fish and lizard will have the same number of genes, but the lizard will have a gene the fish did not have, and will not have a gene that the fish did have.”

Before Carl could add his two cents, Blue Beard added his. “Seriously, EVERYONE better be on the same page here. If you tell me that worms always DID have the genes for gills, eyes and fins, then I am going to label you “Coo coo.” I’ll be all, “GO SELL CRAZY SOMEWHERE ELSE! We’re ALL stocked up here!”

Carl did not argue, but he did roll his eyes with a bit more gusto than usual.

“If I can make an analogy,” offered Tom, “we can think of a living thing like a factory. Say, worms are a factory that makes cars.”

“I don’t think you know anything about worms, Tom!” roared Blue Beard with laughter.

“It’s a metaphor,” Tom replied dryly. “I know worms don’t make cars.”

“Oh, all right. I was gonna be worried about ya,” Blue Beard said, still chuckling. “Continue, lad.”

“For a car factory to make cars, they have to have the blueprints which tell them how to build it. So, if we think of worms as cars with no radio, and we think of fish as cars with a radio, then we can think there has to be an addition to the blueprint in order for the new kind of cars to begin rolling off the assembly line. Right?”

“Yes, that’s exactly the point,” I replied. “Well spoken, Tom! And that actually brings us to the next part of my definition. It says “These new genes then cause an increase in physical complexity and associated behavior.” If I can follow Tom’s metaphor, let’s say that sales is the metaphor equivalent of survival.”

“So, the car sales of the fittest?” suggested Blue Beard.

“Something like that,” I replied. “Multiple versions of the automobile are out there. If no one buys a variety, it stops getting made. It goes extinct. If lots of people buy it, more will be made.

“So to follow the metaphor, it does no good to have the plans for a radio in new blueprints if the factory doesn’t actually make any cars with radios in it. The factory can have all the exciting new blueprints it can hold, but until those prints result in actual cars, then it won’t affect sales at all.”

“I get it,” said Bill. “**The new genes need to cause an increase in physical complexity and associated behavior, because if they do not result in any new physical trait then Natural Selection has no way of acting on those individuals.** That’s what Chuck D. meant by “***Variations neither useful nor injurious would not be affected by natural selection***.”

“Hold on,” said Carl. “Chuck D said what?”

“Sorry,” said Bill. “Let me pull it up.” He pushed the appropriate buttons on his personal electronic device and read for us,

"..individuals having any advantage, however slight, over others, would have the best chance of surviving and procreating their kind[.] On the other hand, we may feel sure that any variation in the least degree injurious would be rigidly destroyed. This preservation of favourable individual differences and variations, and the destruction of those which are injurious, I have called Natural Selection, or the Survival of the Fittest. Variations neither useful nor injurious would not be affected by natural selection.."

-Charles "Chuck D" Darwin, On Origin of Species, 4th chapter, sixth edition."

"Well, well," said Carl. "I didn't think any of you guys had ever cracked the cover of Darwin's book. I figured you were just rejecting a book whose pages you've never seen."

"Like you do with the Bible?" said Blue Beard behind a smirk.

Before Carl could retort, Bill continued making his point. "If a worm somehow gained the genes to make eyes, but didn't actually HAVE eyes, then he has no advantage over other worms. It is possible for genes to be inactive, you see. There are fish in caves who are blind; they do not have eyes at all, whereas their ancestors did have eyes. Those fish do carry the genes for eyes, but the genes are *switched off*.

"If the cave contains eyeless fish, some of which HAVE the genes to make eyes *(Switched off)* and others do not have the genes to make eyes, then the having or not having will make no difference to their ability to survive. Take all of those fish out of the cave and into a normal, lighted environment, and nothing changes until those genes for eyes get expressed by making eyes. Merely HAVING the genes gives no advantage."

"What maybe you guys don't realize," said Carl smugly, "is that this line of arguing assumes Natural Selection to be a fact of Nature. Which, means you are accepting Evolution as true."

"Oh for heaven's sake, Carl," grumbled Blue Beard. "You don't listen at all, do you?"

"They are assuming Natural Selection to be true!" Carl retorted. "Nature acting on varieties to preserve some and destroy others is right out of Darwin's book! Bill just read it to us!"

"It is from Darwin's book," admitted Bill, "but it wasn't invented or discovered by Darwin. Darwin probably learned about it by reading the work of Creationist Edward Blyth, who wrote on Natural Selection years before Darwin published."

"And if you check your handy 3x5 note card," I said, "you'll see that evolution requires *an addition* of genes to a population, whereas Natural Selection merely *removes* genes. Thus, NOT evolution."

"Of course it's evolution!" barked Carl. "It's in the title of Darwin's book! Origin of Species by Means of Natural Selection!"

“Carl,” said Bill in his hypnotically calming voice, “do you not agree that turning a worm into a fish must require the addition of new genes - genes which the worms did not previously have?”
“Well, sure. I suppose.”
“And when Natural Selection causes a variety with what Darwin called ***injurious traits*** to die out, does that add or remove genes from the population?”
“It removes genes, obviously. But that allows the fit to survive. As Darwin said, it preserves the superior, beneficial genes.”
“And when Natural Selection preserves beneficial genes, is it making new genes which previously did not exist, or is it keeping existing genes in the gene pool?”
“It’s keeping existing genes. You can’t preserve something which doesn’t exist. I know that.”
“Then Natural Selection doesn’t make any new genes, does it?”
“No.”
“And by definition, Darwinian Evolution needs to make new genes which did not previously exist.”
“By HIS definition,” Carl said, pointing at me.
“Carl,” I said. “If you don’t like my definition, then just explain to us how you get a worm to evolve into a fish without making any new genes, like the genes for fins, eyes, and gills.”
Carl just crossed his arms and looked offended, so it seemed the matter was dropped for the time being. I strongly suspect Blue Beard would have taken the opportunity to get a rise out of Carl due to his having to concede a point were he not distracted by the arrival of our mountain of Nachos. Whatever differences we may have are set aside when we must join forces in order to take on the Nachos.

Defining Evolution 7: Gaining Behaviors and Losing Genes

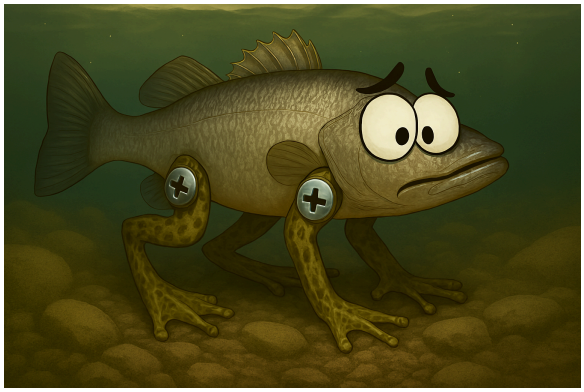
Another Thursday night out with my friends and we were waiting on a plate of Nachos which was so big I am forced to capitalize the word ***"Nachos."*** After long days in the salt mines we make a point to carve out this sacred time to rally round the nourishment inspired by our neighbors to the south and sharpen our wit with conversations about important topics…

You know what? I started a previous Thursday with this exact same description. In fact, last week was pretty close to this too.
I guess there are only so many ways I can say
"We went out for Nachos because it was Thursday."

Anyway, the point I am making is that we, being myself, Bill, Tom, Carl, and Captain Blue Beard, have been engaged in a conversation about a topic which I find is very divisive, in the sense that people fall into one of two camps: Camp one is very certain that Evolution is *(or is not)* true, and Camp two really doesn't give it any thought at all. Sort of like the Electoral College I suppose.

Of course we had our usual table at Danny's Bar, Grill, and House of Rabblerousing, and our charming waitress, Wendy, brought us our usual root beers.
"Your Nachos will be up in a few, guys," she said. "You boys still talking science while you wait?
"We're discussing a definition for Evolution which Rent-A-Friend invented," said Tom. He pulled out the note card with the definition written on it, which I had hand made for each of us, and read it to her.
"Evolution is an unguided, Natural process which increases the genetic information in an organism; Creating new Genes which did not previously exist. These new genes then cause an increase in physical complexity and associated behavior, Both of which increase the organism's ability to survive and pass on these traits to offspring."
"What do you think?" I asked.
"I guess I never thought about it," she said. "At least, not since high school biology."
"That puts you in camp two," I said. "Here, I made you a note card."
"Thanks," she said. "This isn't in place of my tip, is it?"
"No," I replied. "We'll also tip you like we always do. Knowledge is valuable, but we know all too well that you can't pay the bills with it."
"And don't think we haven't tried!" laughed Bill.
Wendy winked and headed off to serve our fellow patrons.
"Hey, why don't you guys explain something to me," said Tom. "The definition doesn't just call for new parts. It says it must cause an increase in physical complexity and associated behavior. What's this about associated behavior?"
"An excellent question, Tom," I said. "I included behavior, because **if an animal gains a new physical feature but not the ability to use it, then he will not survive** either. If a bug somehow gains the genes to be the same color as tree bark, but he maintains the behavior of spending his time on bright green leaves, he will not benefit from his new fashion styles. He must also somehow gain the behavior of hiding out on tree bark.


“If a fish gained the genes to have lungs and legs but not the behavior to breathe with those lungs or walk with those legs, then they are not a help to the fish, and will actually be a terrible hindrance.”
“Legs would be a hindrance?” asked Tom.
“Super Glue some frogs legs on a fish some time” suggested Blue Beard, “and you’ll see what he means.”



“Have you ever plugged a perfectly good webcam into a computer only to find that nothing happens?”
“Sure,” said Tom. “I’ve had that experience with fax machines, printers, copiers, cameras, keyboards and mouses. Or mice.”
“It’s like that,” I said. “Hardware without the software to make it do what you want, does nothing but add dead weight and a cost in resources."
“If by a series of miracles,” said Bill, “a fish developed a fully formed lung but not the neural pathway connecting it to the part of the brain which controls respiration, or if he got both but not the instinct to come up out of the water to breathe, he would have no benefit either.”
“In other words,” I said, “having a lung does a fish no good if he doesn’t also develop the behavior of coming up out of the water to breathe, and the behavior of breathing.”
“Once again,” interrupted Blue Beard, “take a frog, remove his lungs, and put them inside the fish. You don’t get a fish who can survive out of water. You now have a dead fish and a dead frog.”
“Why are you only concerned with ADDING physical traits and behaviors?” asked Carl. “Evolution also includes the loss of existing genes, features, and behaviors. **Doesn’t a fish LOSE gills and fins when he evolves into a lizard? Don’t lizards stop swimming?**”
“That’s a good point Carl,” I replied. “It’s true, according to the evolutionary story, that somewhere along the lines this must have happened. In fact, I suspect there would be a loss of genes, structures and behaviors at every transition, but the changes which cause the loss of features and genes are not evolutionary changes.”
“Why not?” demanded Carl.

“Add legs and lungs and other lizard parts to a fish,” I said, “and you will have an all terrain fish-lizard. **Merely remove gills and fins and swim bladder from a fish and you will only have a dead fish.”**

“Delicious!” said Blue Beard, who I think wasn’t listening closely.

“Those losses may happen,” I said, “but they do not cause a fish to become a lizard. It is the addition of genes for legs and lungs, and the behaviors of breathing air and walking, that make a fish a lizard.”

“Furthermore,” said Bill, “there are lots of changes which create variety within the fish, you see, but if it does not make new physical features that expand the boundaries of its kind, then you are merely making new varieties of fish. If you turn a fish green, he is no closer to becoming a lizard than he was before. Evolutionary changes have to take an animal out of its kind, even if it’s just a tiny step out.”

“I don’t think I get it,” admitted Tom. “If the transitions do involve a loss in genes, structures, and behaviors, then why are you saying those changes aren’t evolutionary changes?”

“OK, Tom,” I said. “Let’s make it super easy and pretend that the only things we need to change to make a fish into a lizard are to add lungs and legs. That’s all - add legs and lungs to the fish and he becomes a lizard.”

“That’s not realistic,” said Carl. “There are probably hundreds of changes which have to be made.”

“Certainly,” I agreed. “But let’s pretend it’s so simple that it can be done in only two steps.”

“OK. Go on.”

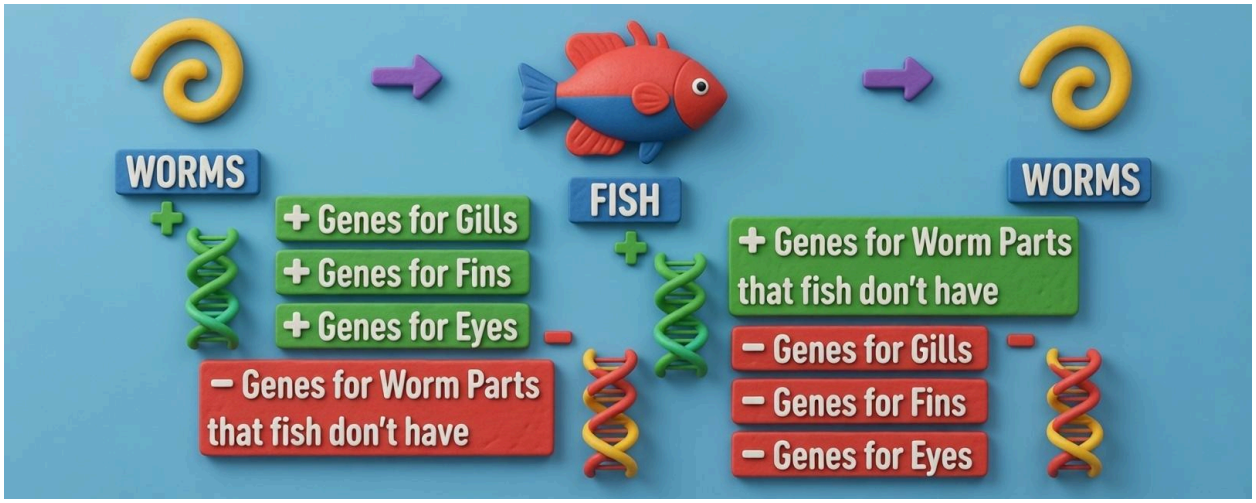
“There are millions of changes which can be made between fish which will never do either of those things,” I said. “Move the fins around. Move the eyes around. Make them bigger or longer or faster or stronger, and you are still nowhere closer to having a lizard. Lose the gills and scales and fins and you still don’t have a lizard. You probably make the fish go extinct. The point is, if you don’t gain the genes and features for the next step up, losing what you have will never work as a substitute. It’ll most likely just kill you.”

“**But couldn’t losing genes and features evolve a kind back into the previous kind?**” asked Tom. “Might the loss of some genes make a fish climb back down the tree into worms?”

“That is an interesting idea,” I admitted. “Bill, what do you know about this?”

“This is where our oversimplification works against us,” Bill said. “See, it takes more than the addition of a few parts to make a new kind of plant or animal. A fish isn’t just a worm with some added parts, so that you could take those parts away and have the worm left over. A worm had parts, and the genes to make those parts, and the

behaviors associated with being a worm which no fish has. So even climbing down the tree, as you say, would require the addition of new genes which the fish does not have."
"But worms already have those genes!" said Carl. "Those genes already exist, so this would not be an example of needing to create new genes which did not previously exist, which shows your definition to be flawed and useless." He tossed his note card onto the table with a smug air of victory.
"I know I've said this before," said Blue Beard, "but you really don't listen, does ya?"
"Can it, fuzz face," retorted Carl. "I've just proven his definition to be flawed. You're not going to wriggle out of it by name calling."
"I've not yet started the name calling," said Blue Beard. "All in good time. But first, let's examine your complaint, shall we? You done said that a fish doesn't need to gain new genes that did not previously exist in order to devolve back into worms, eh?"
"That's right. The genes for worm parts already exist."
"And how, pray tell, are the fish going to get them *from the worms*?" The look on Carl's face was one of dawning comprehension mixed with annoyance. But since he failed to reply out loud, Blue Beard continued. "Perhaps you think the worms might sell them a complete, albeit slightly used set on e-bay?"



"See, now you're just being juvenile," said Carl. "They'd get them the same way anything gets new genes - mutations. If you knew anything about biology, you'd know that."
"And are they, by mutations, gaining genes which already existed *in the fish population*," asked Blue Beard, "or would these mutations have to create new genes, which did not previously exist in the fish of that fish population?"
"They existed in the fish when the fish were worms!" insisted Carl.
"All right lads," sighed Blue Beard. "Carl's hit that point where he's so stubbornly stuck to his position that I'm going to need a helpful metaphor to help him understand it."
"I understand it perfectly…" began Carl.

“Just shush,” said Blue Beard. “You guys know what I’m getting at, right?”
“Oh sure,” answered Bill. “Look, Carl, it’s like this. Imagine you are working at that imaginary car factory from a week or two ago. You and Tom are making cars from the same blueprint. Identical cars, you see. In your first year, you add information to the blueprints which adds a mini-fridge to the dashboard, you see, so you can have a sandwich in the front seat of the car at any time! But in doing so, you lose the radio. That’s how you have room for the fridge - by losing the radio ENTIRELY. Shwoop! Gone! No radio, and now *none of your blueprints include the radio*. The only blueprints you have show a mini-fridge in the dashboard. And one day the company sends you to Mars to run a factory there. So you take a copy of *your blueprint*, and you go to Mars and open a factory. Do you understand?”
“Yes,” said Carl, annoyed. “Of course. I understood when…”

“But!” continued Bill. “The Martians are not buying the new model! Because Mars has an average temperature of MINUS sixty seven degrees!”
“Too bad we didn’t put in a microwave,” I observed.
“So,” said Bill, “the company insists that you go back to making the kind of car which Tom is still making - with a radio. But you don’t have that blueprint any more! And you can’t get it from him because you are on another planet! If you don’t have it, and you can’t get it from Tom, then how are you going to get your factory to make cars with radios so you can sell them on Mars?”
“I’ll have to remove the fridge from my plans and add the radio back in,” said Carl, somewhat bewildered.
“There you go,” said Bill. “You, you see, are the fish. OK? And you do not have the worm radio. You have fish mini-fridge. But you can’t get Tom’s worm radio. You have to make a new one from whatever you have on Mars. It won’t be Tom’s radio - you no

longer have those blueprints. It will be a new Martian Radio. Brand new! Even if by pure chance you wind up designing a radio identical to the one Tom has, it will still have to be made by you on Mars by whatever processes you have to add designs to your blueprint. Thus, new blueprint. New information. New genes."

"So I'm a fish on Mars making radios?" asked Carl.

"Now he's got it!" declared Bill with excitement! And with that Bill turned his attention to draining his root beer.

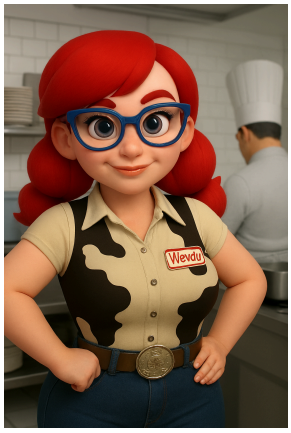
"That's why," I said, "even in the case of a fish devolving back into worms, it would be required to ***increase the genetic information in an organism; Creating new Genes which did not previously exist.*** I'm not saying there won't also be losses in genes from time to time, just that those losses are not what grows the Darwinian tree of life, and thus they are not evolutionary changes."

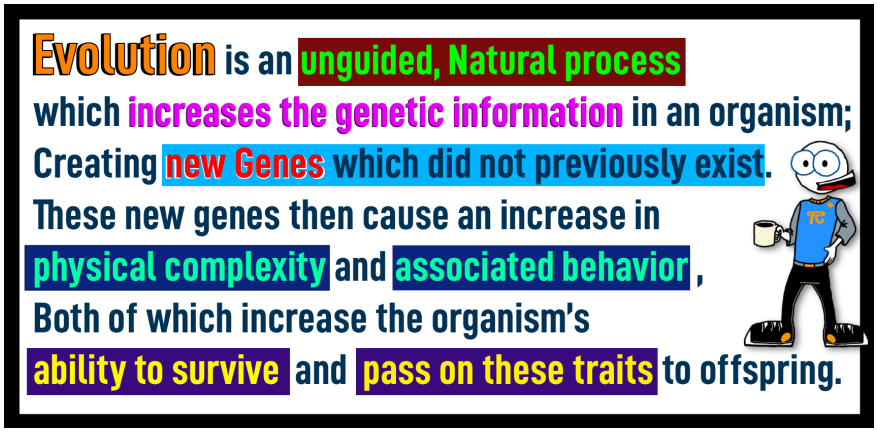
When the Nachos arrived just a few moments later, Carl was still looking somewhat concerned. I don't blame him. Being sent to Mars to be a fish making radios from scratch can take it out of a guy. A hefty pile of nachos and a few rounds of Darts later and he was all right again.

Defining Evolution 8: The Offspring (Keep ‘em separated)

Danny’s Bar, Grill, and House of Rabblerousing was known for many things. First, as I have mentioned many a time, they have a plate of Nachos so large that, in most states, you are required to wear a helmet and safety glasses while even seated at the same table. Some nights they have live music from local bands, and every night they have darts, foosball, and unless it is covered in a buffalo wing buffet, a pool table.

Each Thursday I meet my good friends Captain Blue Beard, Bill, Tom, and Carl at our round table near the dart board. What brings us, aside from the good company and an arguably dangerous pile of Nachos is our affable and lovely waitress, Wendy.





In addition to our frosty mugs of root beer, Wendy met us this night with a scientific quandary. I had written a definition for Darwinian Evolution on 3 x 5 inch note cards and given them out to the company, including Wendy, and it was on this topic which she addressed us.

“OK, so according to this card you gave me,” she said, “**Evolution is an unguided, Natural process which increases the genetic information in an organism; Creating new Genes which did not previously exist. These new genes then cause an increase in physical complexity and associated behavior, Both of which increase the organism’s ability to survive and pass on these traits to offspring.**

I think most of this makes sense, but can you simplify this phrase for me? “Both of which increase the organism’s ability to survive and pass on these traits to offspring.” It’s been a long time since high school biology.”

“Certainly!” I replied with enthusiasm. “There are two major reasons why this is a necessary component of evolution.

1. Dead things don't reproduce.
2. Things that don't reproduce- also don't reproduce.
I hope I'm not making things too complex."
"No," she said with a laugh. "I think I follow you so far. But, you mean to say that these new genes, features, and associated behaviors increase the organism's ability to survive, and increase the organism's ability to reproduce? It has to do both?"
"It has to do both," I said.
"Why both? Why isn't it good enough to just increase their chances of survival OR ability to reproduce?"
"Imagine that some creature, let's say a turtle, gets a great mutation which causes it to be really fast. Fastest Turtle ever. But as a result, the female turtles think he's a freak and refuse to mate with him."
"Blue Beard knows how that feels, don't you Captain?" said Tom with a grin.
"Not true!" he bellowed in return. "Many a lass has sought to catch the Captain in bonds matrimonial, but none of them have been fast enough to catch me!" He laughed heartily and drank from his frost mug of root beer. "Though I guess I do know what it feels like to be as fast as a mutant turtle."
"So because the turtle is breaking the land speed turtle record," Wendy said, "he's got a better chance of surviving than other turtles, but he will have no baby turtles," she said.
"And thus," I said professorially, "the genes which make him El Tortuga Ayunar die with him, and no evolution occurs."

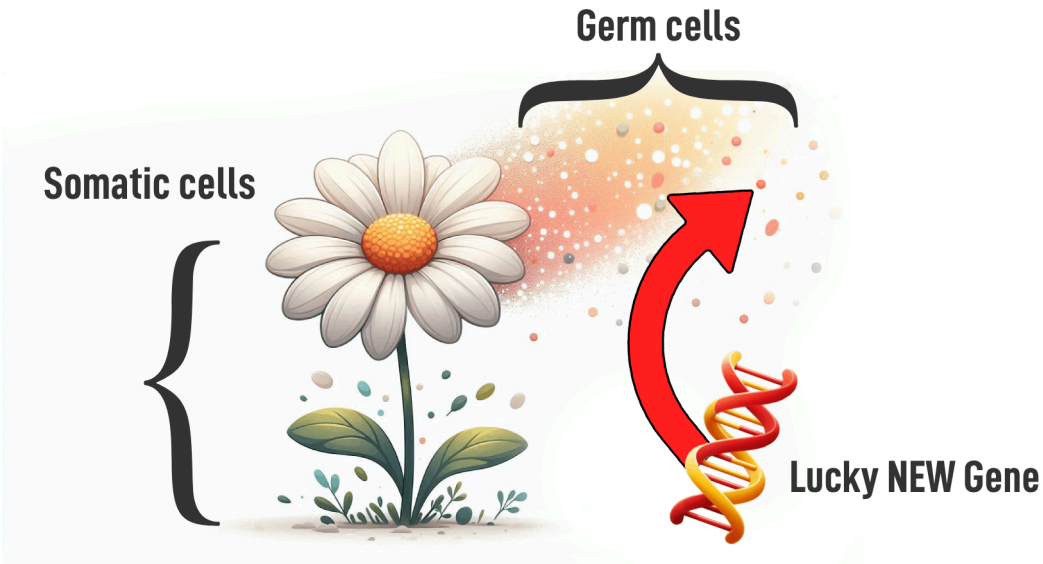
"What if he has a mutation which makes him irresistible to girl turtles?" Wendy asked. "Isn't a mutation which makes it more likely that you'll reproduce good enough?"
"Not alone," I answered. "What if he does have the Romeo gene and has, as a result, twice as many offspring as other turtles? But, what if those offspring as a result are LESS likely to live to adulthood?"

“Why would they be less likely to survive?” demanded Carl. “That’s totally ad hoc.”
“Well, perhaps the fact that they are irresistible,” I pondered, “means the adult turtles are always around them, and they get stepped on, or unable to get to food or away from predators.”
“Romeo Turtle will have more children than his brothers,” said Bill, “but will have FEWER grand-turtles than his brothers, and thus again, no evolution.”
“Or worse,” said Blue Beard. “What if Romeo Turtle’s pheromones, which make him irresistible to girl turtles, ALSO attract predators? The Romeo Gene WOULD have given him twice the offspring, but it actually results in fewer because it gets him eaten sooner!

I’ve had a bad bottle or two of cologne which almost did the same for me. Although it may have been barbeque sauce…”
“So whatever the super new gene is,” said Tom, “if it’s a Romeo Gene which increases their chance of reproducing, they have to still have as much of a chance of surviving to do so.”
“Or no Evolution,” I said.
“And if it’s the Speedy gene,” said Tom, “which increases their chance of surviving to reproduce, it has to not interfere with their chances of mating.”
“Yes,” I said, “but in either case the gene cannot have any ill effect on the offspring. If the Romeo gene gets them eaten before they are old enough to mate, or if the speedy gene increases their odds of running headfirst into a wall to their own demise, the evolution still stops because the gene, while beneficial in one sense, is detrimental in another.”
“So the definition implies an increased ability to survive and reproduce into future generations,” said Bill, “not merely the first generation that gets that lucky supergene.”
“That’s right!” I said, indicating my joy by rapping my root beer against his.

“OK,” Wendy said. “I think I get it. The most important thing, as far as this definition goes, is passing on the genes to future generations. So a gene which helps them live, but not to reproduce doesn’t do the job. And if it would help them reproduce, but doesn’t help them live long enough to do so, it still is a dead end.”
“Yeah,” I agreed. “Basically.”
“OK, thanks,” she said. “I’ll go see how your Nachos are coming.” And she headed off to the kitchen.
“So the point you’re making,” said Bill, “is that the mutation which makes new genetic information must at least NOT hinder the organism’s ability to survive and reproduce, because either would make it a harmful mutation.”
“Right,” I said. “Whether it helps or not, as long as it doesn’t hinder the individuals who carry it, those changes can stay in the population where it might be added to by the next lucky mutation, until the mutations add up to big changes or sudden death. And if you check my definition, you’ll be able to figure out that only the big changes are evolution. Sudden death, while a change in living things, is not evolution.”
“I’ve got a question about the same line in your definition,” said Tom. “***“Both of which increase the organism’s ability to survive and pass on these traits to offspring.”*** I’ve read in various books the idea that Evolution doesn’t happen to individuals, or in an organism. Evolution happens to populations.”
“That all depends on how you define evolution,” I reminded him. “Some people define it as a change in allele frequency, which of course means you have to consider a whole population at once. No one individual organism will have a change in allele frequency. But we’re talking about the growth of the Evolutionary Tree. Making new kinds of animals requires new genes for structures and associated behaviors which they did not have before. Those would be the result of mutations adding information in a single individual which would be then passed on to its offspring, and if beneficial, become a more frequent feature in the population.”
“Then you’ve just agreed with the textbook definitions!” exclaimed Carl. “Evolution is a change in allele frequency. The new gene goes from 0% to, maybe in enough time, 100% of the population.”
“No, you have it backwards, Carl,” I said. “Evolution isn’t a change in allele frequency. Evolution, the addition of beneficial genes, would *cause* a change in allele frequency. It’s not a synonym. They are a cause and effect relationship.”
“Yeah,” interjected Blue Beard, “it’s like, a lifetime supply of doughnuts wouldn’t BE obesity. It would CAUSE obesity. Somethin’ like that.”
“A lifetime supply of doughnuts might both be and cause happiness,” I suggested.
“But you digress,” said Carl.
“Just as a matter of definition,” said Bill, “or rather, to make clear the definition, we should talk about how mutations would have to work to make new genes to get passed

on. The process gets a little more complex when you consider how unlikely it is to not only GET a new gene, but to get it passed onto the next generation."
"Now there I know you're wrong," said Carl. "Most living things have trillions of cells, and mutations are happening all of the time. Getting a beneficial mutation is just a matter of time."
"It's not as easy as it sounds," said Bill. "To show the math, let's start out by defining the two kinds of cells found in an animal or plant.
1. Somatic cell: any body cell that is not involved in reproduction.
2. Germ cell: a cell that will create reproductive cells called gametes.



Of the MILLIONS of cells you have, if the mutation which causes the creation of a beneficial new gene happens in one of the MILLIONS of cells which are Somatic cells, then nothing is gained."
"There is a good chance that the cell which the new gene is in won't even USE that gene," I added. Carl raised his eyebrow at me. "You've got 20,000 genes! Your cells don't have time to use them all! They have to prioritize, so they find a collection of their favorites and just stick with it. You'd do the same thing, trust me."
"Even if the cell does use that mutation," Bill continued, "it doesn't make any evolutionary difference because it will die with you. Changes in somatic cells are not passed onto offspring, and so don't matter to evolution."
"Now consider germ cells which produce gametes," I said. "No animal or plant makes those one at a time. They tend to be made by the millions as well. So for the evolution to happen, the beneficial mutations which cause the creation of a new gene have to happen in the germ cells/gametes which happen to find the matching gametes, and not the MILLIONS of them which fail to fertilize a member of the next generation. If the lucky piece of pollen with a beneficial mutation, out of millions of pollen grains without it, just

gets stuck to a spider web and doesn't make a new plant, then the lucky mutation means nothing. It's got to get to a flower!"
"Some accident causes a misspelling which is actually helpful," asked Blue Beard, "but not to the individual what it happens in? So all them comic books is wrong? I thought a useful mutation gave you super powers or something helpful like that."
"Sorry, Captain," said Bill. "Again, just to clarify, the new genes can't benefit the first individual who carries it because it must be contained in a germ cell. In fact, it must be made in a germ cell. The germ cell it happens in then has a slim chance of winding up as a member of the next generation. When it DOES become a new organism, that mutation has to increase the organism's ability to survive and pass on these traits to offspring. Meaning, the new gene created by the mutation in the parent, must help all of the subsequent organisms which carry and express the gene to survive and reproduce."
"So if a mutation makes the speedy Romeo gene in a Turtle," said Blue Beard, "but in one of his millions of Somatic cells, nothing happens."
"Right," said Bill. "He'd have one really fast cell."
"And if the speedy Romeo gene happens in a turtle's germ cells," continued Blue Beard, "but the germ cell it happens in doesn't get used making a new turtle, then the gene dies with that germ cell and again nothing happens."
"Yup."
"In terms of your definition," said Tom, staring at his note card, "the process which creates new genes happens in the parent, and makes new genetic information in their germ cells, which doesn't help the parent, or change them at all."
"Right," I said. "Being the first carrier of the lucky new gene doesn't help you, and doesn't even help you pass it along to the next generation. Getting that new gene into the population and expressed as new features is truly just dumb luck."
"T'was the idea of Darwin's book, wasn't it?" asked Blue Beard, tongue in cheek. "Survival of the Just Dumb Luckiest?"
"And these new genes," continued Tom, ignoring our pirate friend, "cause an increase in physical complexity and associated behavior, both of which helps the offspring, not the parent, to survive and pass on these traits to offspring of their own."
"That's right. Do you think I should have said it that way?"
"I think it's a mouthful already," said Blue Beard, staring at his own note card. "What with Tom's additions, it would read, ***"Evolution is an unguided, Natural process which increases the genetic information in an organism's germ cells; Creating new Genes, which did not previously exist, in a germ cell which is used in the creation of the next generation of organisms, so that the members of the next generation that carry the genes can express them.***
These new genes then, if expressed, cause an increase in physical complexity and associated behavior, both of which helps the offspring, not the parent, to

survive and pass on these traits to offspring of their own." I'm getting winded just trying to get through this. I think it was fine how it was. Otherwise you start writing a book about this nonsense."

I thanked Blue Beard, and we turned our attention to Wendy as she came forth with the great mountain of feasting which was our Nachos.

As we began to munch happily on our bountiful southern delight, I expressed a gladness that we had worked our way through my definition and come to understand it together. Next week, I suggested, we begin to make use of it by going through the various mechanisms of Darwinian Evolution to see if they could, when understood in the light of a clear and useful definition, actually cause Evolution to happen.

Defining Evolution 9: Survival of the “Good Enough for Now”

Ordinarily I begin at the start of a new Thursday, but there was a conversation which the lads and I had during the end of our weekly run at Nacho hill at Danny’s Bar, Grill, and House of Rabblerousing which I think was worth retelling.

Before our Nachos came to the table, I had said, *“Being the first carrier of the lucky new gene doesn’t help you, and doesn’t even help you pass it along to the next generation. Getting that new gene into the population and expressed as new features is truly just dumb luck.”*

And Blue Beard had replied in his cheeky manner, *“T’was the idea of Darwin’s book, wasn’t it? Survival of the Just Dumb Luckiest?”*

And while we were munching on the week’s Nacho intake, I got to thinking about Darwin’s Original idea, survival of the Fittest, and I started to get ideas.

“Hey,” I said, once our assault on the Nachos had begun to subside, “have you guys ever really considered Darwin’s idea of ***Survival of the Fittest***?”

“Is it finally dawning on you that something Darwin wrote is so obvious that even you can’t deny it?” asked Carl, full of vinegar, emotionally speaking.

“Actually, quite the opposite,” I said. “I’m starting to think that he’s even wrong about that.”

“Oh, come now,” said Carl. “How can you doubt something so obvious?”

“Well, why don’t you explain the idea to us,” I suggested, “and we’ll see what we can discover?”

“The idea is simple,” Carl began. “Natural Selection works to eliminate any members of a population whose genes and traits are a hindrance to survival, and it favors and preserves the fittest, meaning those which are the best adapted to their particular

environment. It has to create beneficial physical traits and behaviors which help the members survive and reproduce more than the members who do not carry it. SOMEHOW, due to benefits to their chances of survival and reproduction, Natural Selection makes that trait a bigger part of the population. Those that survive are the fittest because the have the trait that makes them the fittest."

"Or does it?" I asked. "Does Natural Selection really have to cause a *beneficial* gene or feature to become *the most frequent*? I mean, how common is the platypus? But they exist, right? I mean, as long as they don't go extinct, what does it matter how well they fare when compared to the rest? Do we REALLY need to accept survival of ***the fittest***? Isn't there pretty good reason to accept survival of the ***good enough***?"

"I'm with him," said Blue Beard. "Let's face it, natural selection isn't really anything to shout about. Have you ever seen squirrels? Those idiot things run out into traffic ALL OF THE TIME. If natural selection really affected a species, then the "Don't run in front of oncoming trucks" gene should really be in EVERY squirrel, but hardly ANY of them have it!"

"This whole Darwinian thing," I continued, "is based on the premise that the world has far more living things than it can sustain, and so they are always in competition with each other and only the fittest survive. But that's simply not true. There are certainly pockets in enclosed ecosystems where this might be true, but it's hardly the norm."

"The squirrels in my neighborhood aren't fighting to the death over anything except WiFi access points," added Blue Beard.

"And there are all KINDS of populations which have been measured to be on the rise over decades of research," said Bill. "Just check the population of armadillos in the United States. You're not going to find that we've hit the MAXIMUM armadillo population which the country can sustain. Sure, there is a hypothetical maximum where the land can support NO MORE of a kind of plant, and the plants can feed NO MORE of a kind of herbivore, etc etc. But where do we actually see this happening?"

“Crud,” said Blue Beard, Nachos still in his hands. “This stupid evolution thing is wrong at every level! No wonder no one wants to try and define it. You can’t get anywhere without running into a place where it fails!”

“I can’t believe you simpletons,” said Carl with disgust. “The very definition of ‘the fittest’ is the thing best capable of surviving and reproducing. How can you not see that the variations most capable of surviving and reproducing would survive and reproduce?”

“Carl, I don’t think even you believe this survival of the fittest thing,” I said. “This is your reason for rejecting the creationist rebuttal of “IF apes evolved into men, why are there still apes?” Any evolutionist will tell you that not all apes evolved into men just as not all worms evolved into fish. Some worms ***stayed worms***. And not all of the fish evolved into lizards. Some stayed fish. So while SOME fish got the super new genes which pushed them more and more into becoming lizards, all around them were fish who just stayed fish. And we still have fish today. So what’s this survival of the fittest nonsense?”

“Rent-A-Friend makes an interesting point,” said Bill. “Obviously any fish who was not THE FITTEST, you understand? But who was ***fit enough*** survived, and the FITTER fish who eventually became lizards eventually left for dry land, and the less fit fish who stuck it out became the fittest again merely by default.”

“In fact,” I added, the picture becoming clearer all the time, “the fish who were becoming lizards didn’t NEED to be the fittest. They just needed to not go extinct! Even if you have a BILLION fish-fish and only half a dozen lizard-fish, you can still have the gradual progression which resulted in lizards, as long as every step along the way was ***good enough*** to survive. They didn’t have to be THE FITTEST. They just needed to be fit enough for now. I say we embrace the process of **Survival of the Good Enough**.”

“AND,” interjected Blue Beard, “survival of the Just Dumb Luckiest. Don’ forget about them.”

“Perhaps you all are forgetting,” said Carl clenching his teeth a bit, “that Darwin based his theories on observation, not on mere speculation over Nachos!”
“OK,” I said. “Just check your Peppered Moths. Those guys come in two flavors, white with black spots and black with white spots. They live among trees which are fairly light in color, and so the dark ones are easier to spot and eat (if you’re into that sort of thing). According to online research Bill did, the percentage of dark moths in the population was less than 5%. Then the industrial revolution hit, and the soot from factories made all the trees dark, thus allowing the dark ones to hide more efficiently. Soon, the dark moths were more than 95% of the population. After many decades, the powers that be got a grip on those factories and reduced the soot output by a HUGE amount, and the trees returned to their original colors, and the percentages of light to dark moths returned to their original numbers.”

“Yes,” said Carl, somewhat confused, “and Peppered Moths are an example of Natural Selection at work! It is literally a textbook example!”
“Yes, but there are two huge and obvious problems with it,” I said. “First, *before* the soot turned the trees dark, the dark moths had a serious disadvantage and were less fit, but *they were still there*. When the trees turned dark, the light moths were now at a disadvantage, *BUT THEY WERE STILL THERE*. And after the trees went back to normal, the dark moths, now at a disadvantage again, *STILL EXISTED*. They were not the fittest, but they were ***good enough*** to survive.”
“Yeah, Carl, “said Blue Beard, gesturing with a fist full of Nacho. “If Natural Selection was only going to favor the MOST fit, then why were there any dark moths at all by the time the trees got all dirty? Those guys must have been the underdogs for possibly CENTURIES and yet they were good enough to continue surviving!
“Certainly, the environment favored a certain variety and the numbers showed that,” I pointed out, “but the less fit DID NOT GO AWAY. Which means this ***survival*** of the fittest thing can only explain the *percentages* of variations in a population. It says

nothing about actual survival. For that, I propose “the **Popularity of the Fittest**” and “the **Survival of the Good Enough**.”

“You guys obviously don’t understand the concept Darwin was putting forth,” said Carl dismissively. “Moths or no moths. He called it Survival of the Fittest for a reason.”

“I wouldn’t be so quick to dismiss the Survival of the Good Enough in the name of Darwin,” said Bill, holding his personal electronic device. “Chuck D accidentally admits this when he says the following:

> ***“This preservation of favourable individual differences and variations, and the destruction of those which are injurious, I have called Natural Selection, or the Survival of the Fittest. Variations neither useful nor injurious would not be affected by natural selection..”***
>
> *– Origin of Species, Chuck D, Chapter 4, version 6.”*

“That’s my point exactly!” I exclaimed. “If variations which are NOT the most fit are left alone by natural selection, then why are we saying natural selection is equivalent to Survival of the Fittest? Doesn’t he admit that Natural selection caused the survival of the good enough? The fittest would actually be determined, not by survival, but by maintaining a higher percentage of the population over time. I would suggest that Darwin’s own words show his idea of Survival of the Fittest to be wrong, and he knew it.”

“So where does that leave us?” asked Bill.

“Well, it means we are replacing Survival of the Fittest with What Darwin actually intended, **Popularity of the Fittest**, and then what he acknowledges in his section on Natural Selection: **Survival of the Good Enough**,” I said.

“Which has a subset that may or may not be good enough and survive anyway,” said Blue Beard, “which I am calling the **Survival of the Just Dumb Luckiest.**”

“Which we will write about in our book which is dedicated to the idea that migrating creatures can cause a change in allele frequency in a population, which we will define as evolution, so we can call our book “Moving to a New Neighborhood of the Species.”

“You guys are hysterical,” said Carl without sincerity, and he headed to the dart board. We were all quick to follow, and the night passed in the fun and frivolous manner in which it is intended.

Defining Evolution 10: Natural Selection

Once again, a Thursday has come and my friends and I have slogged through it like a team of oxen pulling a wagon train through a muddy fiord. What gives us strength to carry on, though Friday is a day away and the weekend even further, is the knowledge that Nachos are just around the corner. I mean that both figuratively and literally, as the Nachos are our Thursday night fiesta, and Danny's Bar, Grill, and House of Rabblerousing is only a few blocks from where any of us work.

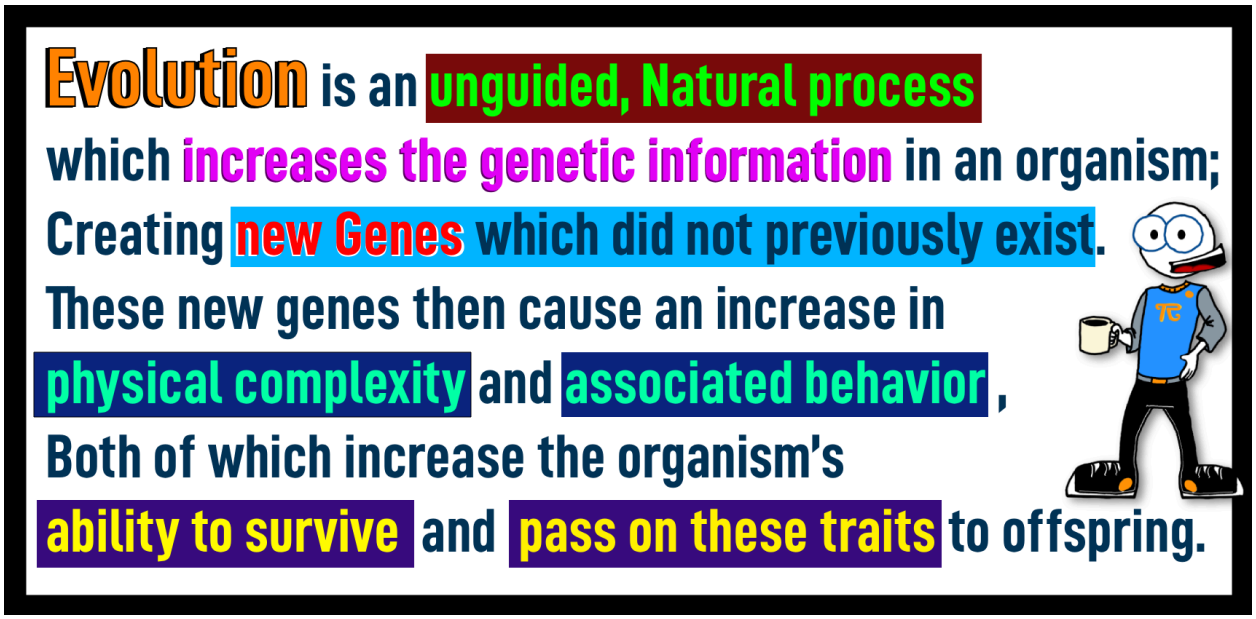
We gathered once again at the round table near the dart board to continue the conversation we started some weeks ago about the historicity of the Darwinian Dogma.

"My good friends," I said, standing tall, root beer in frosty mug in hand, "as you recall, I have given a gift to the world. I have provided the very first useful definition of Darwinian Evolution:

Evolution is an unguided, Natural process which increases the genetic information in an organism; Creating new Genes which did not previously exist. These new genes then cause an increase in physical complexity and associated behavior, Both of which increase the organism's ability to survive and pass on these traits to offspring.

"Seriously?" Carl blurted out. "Are you really going to read it to us every week? I think we've got it by now."

"It's a wonderful addition to science," I said, undaunted, "and I think it bears repeating.



"Anyways, on prior Thursdays I explained this in detail to make sure it was clear, and to make sure you all knew why it says what it says. Now I am going to begin making use of

it to show why Darwinian Evolution is a paper thin mythology which is proven wrong by science, starting with Natural Selection."
"I would like to suggest," said Carl boldly, "that you are a big liar with pants in flames."
"What do you mean?" I demanded.
Carl rolled his eyes. "I'm making reference to the playground colloquialism, *Liar, Liar, pants on fire*."
"Yes, I got that," I said. "I'm asking why I am a liar."
"You just said you are going to use Natural Selection to prove Evolution wrong."
"I did, and I shall."
"Which means," said Carl, "you claim you are going to use evolution to prove evolution wrong."
"Ah!" I exclaimed. "But this is exactly why I recite the definition! Natural Selection is not synonymous with Evolution. It is merely proposed as a mechanism of Darwinian Evolution. I will show it fails badly as a mechanism. Even so I will try to play it safe by getting my definition of Natural Selection from Darwin himself. If you refuse to accept Darwin as an authority on Darwinian Evolution, don't get angry at me. Instead, talk to your doctor about getting your prescription changed. Bill, would you do the honors?"

"Gladly," said Bill. He raised his portable electronic device to eye level and proceeded to read from Origin of Species, Chuck D, Chapter 4, version 6 *(version 6 for Windows, Version 8.1 for Mac):*

> ***"This preservation of favourable individual differences and variations, and the destruction of those which are injurious, I have called Natural Selection, or the Survival of the Fittest. Variations neither useful nor injurious would not be affected by natural selection.."***

"The words of Chuck D, may he rest in peace under his huge marble statue."

“Amen,” said Blue Beard, who may not have been listening.
“Listen carefully my friends,” I said, “and you will see that Darwin does not give Natural Selection any creative powers.”
“Hold on,” interjected Tom. “From what I’ve read, many people like to say that Natural Selection CREATES, or PROVIDES adaptations, which would be features they need to adapt to their environment.” Tom pulled a notebook out of his man-bag and flipped to the desired page. “In the words of “The Understanding Evolution Team!”
“Natural Selection can produce amazing adaptations.”
“It’s true,” I replied, pulling a notebook of my own from my man-bag, “that many Evolutionists DO attribute creative powers to Natural Selection. Yet when I consult a team of Evolutionists which include half a dozen PhD’s and the involvement of a college, a Museum, and a pro-evolution propaganda machine, they say this:
“Natural Selection ***cannot*** *try to supply what an organism “needs.”* ***Natural Selection just selects from whatever variations exist in the population****.”*
Thus, if it JUST SELECTS from whatever variations exist in the population, it can’t be said to CREATE those variations.”
“Hold on,” said Carl. “Who is this team of PhD’s you’re quoting in response to Tom’s team of PhD’s?”
“Oh, did I forget to cite my sources?” I replied. I presented my own notebook and flipped to the desired page, showing it to Carl. “This quote was ALSO written by “The Understanding Evolution Team!”
“You got that quote from the SAME people I got mine from?” asked Tom in disbelief.
“Not merely from the same people,” I said, “but from *the same page* of *the same website*. Your quote and mine can be found only a few paragraphs apart.
“Carl, if you really want to know what it’s like to be me, imagine you could surf on over to any Creationist website and find them saying, “*God made the world and all living things in six literal days*,” and then, a paragraph later find them saying, “*But of course the world didn’t come into being in a single week*.” That’s what it’s like.”
“This proves nothing,” said Carl sternly. “Just because a bunch of geeks writing a web site can make errors in writing doesn’t mean Darwinian Evolution is false.”
“That’s fair enough,” I said. “Let’s see if Darwin himself agrees with the team, or if Darwin would disagree with them. Bill, what does Darwin himself say about the creative powers of Natural Selection?”
Bill cleared his throat in dramatic fashion and then read aloud, “Ladies and Gentlemen, please turn in your hymnals to Origin of Species, Chuck D, Chapter 4, version 6. Quoting:

> ***“Some have even imagined that natural selection induces variability, whereas it implies only the preservation of such variations as arise and are beneficial to the being under its conditions of life.”***

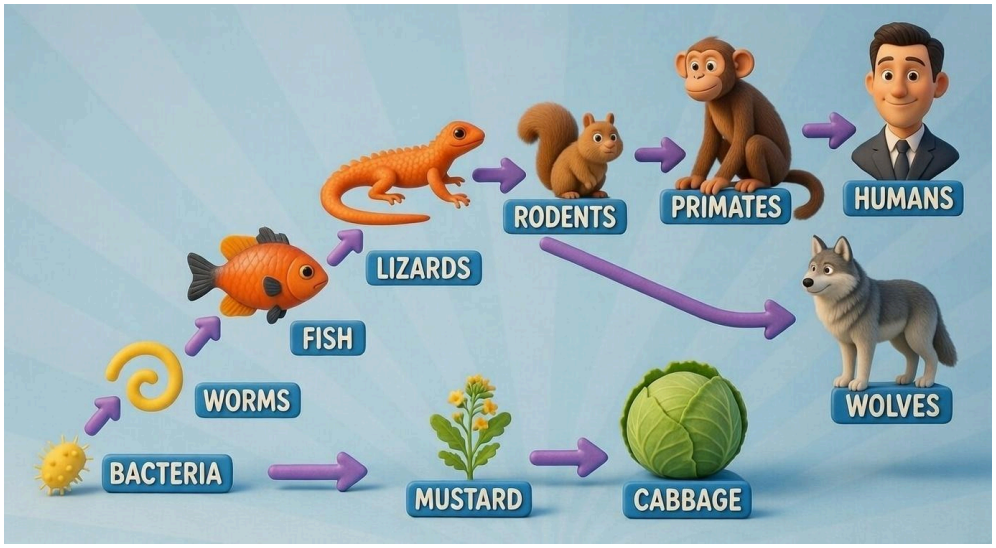
Close Quotes. Amen."

"So, by 'Induces Variability'," said Blue Beard, "Chuck D is saying, some folks think that Natural Selection makes new variations on a kind of plant or animal. But he says here that Natural Selection doesn't create anything. It "preserves" beneficial variations, removes harmful variations, and, if I recall the previous quote, ignores the variations which are neither helpful nor harmful. 'Sat about sum it up?"

"Indeed it does, Blue Beard," I replied. "In short, Natural Selection is an editor. It either leaves alone, or it cuts out, but it does not write. It does not produce new information. It does not cause new genes to come into existence. Chuck D imagines that variations arise SOMEHOW, but he makes clear that Natural Selection is NOT that somehow. Thus, by our very useful definition, Natural Selection is NOT evolution."

"Oh, I get it," said Carl, his words dripping with sarcasm and his mug dripping with root beer. "You wrote that definition of yours specifically so you could discredit Natural Selection as the Origin of Species. It's a literary sleight of hand. But scientists for more than a century have accepted Darwin at his word, which tells me clearly that your definition is wrong. It exists only so you can use it to attack well established Darwinian Science."

"You're welcome to disagree with my definition," I replied, "but I think the past few weeks have shown that you have no basis on which to do so. Consider what Bill read, and then think about the Darwinian Tree of Life."



"That's right," said Bill. "We agreed that the growth of the Tree of Life requires the addition of new genes which did not previously exist. The leaving alone of genes which already exist, or the removal of genes which already exist, will never cause the creation of genes which do not yet exist. No genes which exist now were brought into existence by a process which leaves existing genes alone or cuts existing genes out."

“However badly you want to defend the title of Darwin’s book,” added Blue Beard, “he admits in his own words that Natural Selection can NEVER be the origin of a species.”
“It could, if conditions are right,” said Tom thoughtfully, "drive a species to extinction.”
“True,” I agreed. “But again, if someone tries to define “Evolution” so that it includes extinction, they are using the word wrong and should really spend some time trying to find out what word they mean to be using.”
“In conclusion,” said Blue Beard, “Darwin tells us himself that Natural Selection is not, and can never be the origin of a species.”
“When we consider the genetic component,” added Bill helpfully, “Natural selection only removes genes that already exist. It doesn’t do anything else.”
“Thus,” I said, “Natural Selection is NOT evolution and cannot cause evolution to occur. This bit of the book wherein he explains that Natural Selection doesn’t create new variations but only removes the harmful ones, is in the sixth edition of his book, not in the first edition. And I don’t think I’m too far off when I suggest Darwin wasn’t bright enough himself to figure this out before he titled his book and sent it to the printers.”
The giant pile of Nachos held by our dependable waitress, Wendy, told me that I had said enough for one week. It was time to dig into the bounty that was the Thursday night Fiesta. Before we adjourned for the night, we agreed that the following week we would take a close look at more mechanisms of Evolution as were found in various textbooks- Genetic Drift, Migration, and Changes in Allele frequency. Until then, there were darts to throw, and songs to be sung because the weekend was always a day away.

“Nowhere was Darwin able to point to one bona fide case of natural selection having actually generated evolutionary change in nature…Ultimately, the Darwinian theory of evolution is no more nor less than the great cosmogenic myth of the twentieth century.”
-Michael Denton, Evolution: A Theory in Crises pp. 62, 358.

Defining Evolution 11: Genetic Drift/Migration & Changes in Allele Frequency

“Hello again friends,” I said, standing tall, root beer in hand, “and welcome back to another discussion certain to get hate from people who don’t understand either side of the debate. When it comes to Creation vs Evolution I find there are a lot of people who defend evolution as fact with great emotion, and condemn me quite violently for rejecting it. Yet a little dialogue quickly shows that most of these people have literally no idea what Darwinian Evolution is.

“Because I am a friend to all people, I have created a wonderful definition for Darwinian Evolution and explained it in detail, and now I am using that very clear definition to explain why evolution literally never happens and is, almost entirely, literally impossible. Now let’s remind ourselves of my very useful definition of Evolution.”

“All rise for the reading of the definition!” said Blue Beard, standing with me. Tom and Bill chuckled but remained seated. I read aloud from my handwritten note card.

“Evolution is an unguided, Natural process which increases the genetic information in an organism; Creating new Genes which did not previously exist. These new genes then cause an increase in physical complexity and associated behavior, Both of which increase the organism’s ability to survive and pass on these traits to offspring.”

The only reason I was able to get this far without any flack from Carl was that he had not arrived yet. It was while I was reminding us of my very useful definition that he came in the door to Danny’s Bar, Grill, and House of Rabblerousing and joined us at the round table near the dart board. We greeted him in cordial fashion and got him a root beer via our affable waitress, Wendy, and then got right to our continuing discussion.

“Today’s alleged mechanism of Evolution,” I said, getting us on track, “is Genetic Drift/Migration. I put these terms together because they are essentially the same thing. Carl? Please define for us the concept.”

Carl sat, root beer in hand, and spouted off his understanding with something between moxie and disinterest. “Some plant or animal moves to a new geographical location,” he said. “This either adds their genes to a population where those genes did not already exist, or it increases the percentage of the population which carry those genes, causing an increase in allele frequency.”

“So Genetic Drift IS Migration?” asked Blue Beard.

“Essentially,” replied Carl. “It’s also known as a *genetic shift*.”

“And both of them merely mean, well, migration?” asked Blue Beard. “Something moving to a new place where it didn’t previously live?”

“That’s right,” said Carl. “Which for any particular population can cause evolution in the sense that the population gains new genes, or experiences a change in allele frequency.”

“It should be painfully obvious right away,” I interjected, “that moving genes from one place to another does not make any new genes. Because, **Moving genes from one place on earth to another place on earth does not create any new genes.** The genes which are moved existed before they moved, and they are the same genes after they move.” Even Carl couldn’t argue with this point. “Thus, by not only my definition of evolution, but pretty much any basic, fourth grade understanding of evolution, Genetic Drift/Migration are NOT evolution.”

“I don’t have a good quote from Charles “Chuck D” Darwin about this,” added Bill, “but I think I can, with some confidence, say that he titled his book, “On Origin of Species,” and not “Moving to a new Neighborhood of Species.”

“Now let’s consider this again,” said Carl, “from a different point of view. Specifically, from a point of view not entirely bent on rejecting science because of their religion.”

“Ooh!” said Blue Beard with insincerity. “Carl is going to teach us from the sacred texts of SCIENCE!”

Carl continued with no notice of our pirate friend. “I have a different definition of Evolution, which I attained from http://www.talkorigins.org/faqs/evolution-definition.html,” and he read it to us:

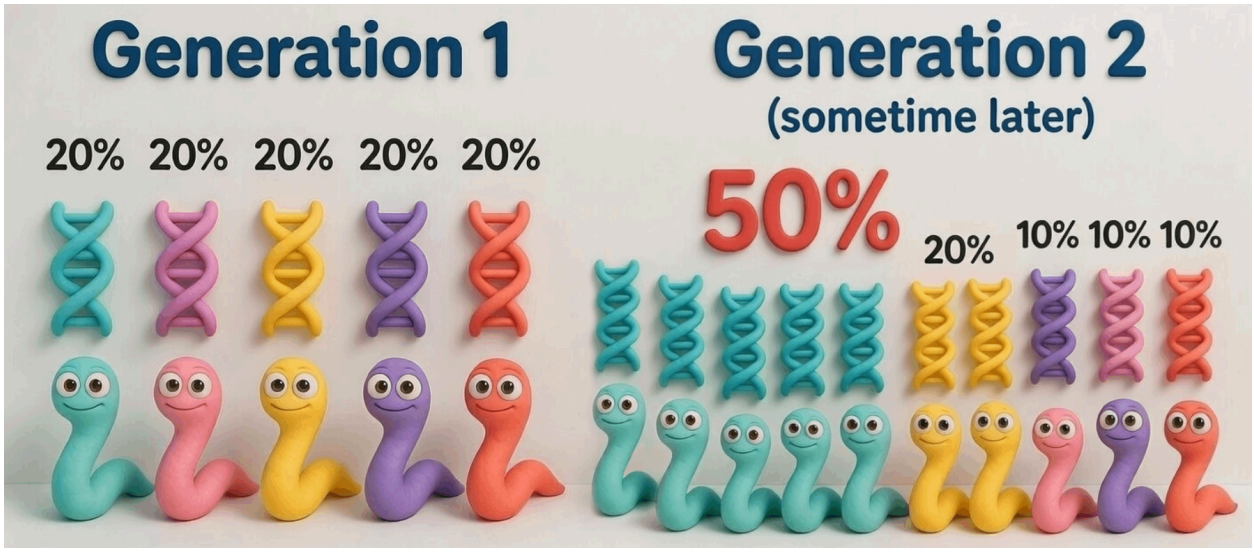
> ***“..evolution can be precisely defined as any change in the frequency of alleles within a gene pool from one generation to the next.”***
>
> *– Helena Curtis and N. Sue Barnes, Biology, 5th ed. 1989 Worth Publishers, p.974.”*

“So you can see,” Carl said in the way Carl says things, “when you don’t start with a definition written by a science hating religious fanatic, Genetic Drift does cause evolution.”

“Your mind is a wonder,” I admitted to Carl. “So, even though we all agreed that my definition works well, and you had no functional rejection of it, you’ve now tossed it out and adopted a different one so that you can maintain Genetic Drift as a mechanism of Evolution.”
“Your definition was flawed,” Carl stated with rigidity, “because it was designed to discount mechanisms of Evolution. This definition is a widely accepted one and allows us to accept observed science over your religious beliefs.”
Blue Beard was about to say something, but I waved him down with my root beer and said, “Very good Carl. In the name of science, we will look at Changes in Allele Frequency.”
“First we need to know a few terms,” suggested Tom. “Bill, can you define ‘alleles’ for us again?”
“I can do better,” said Bill. “And Carl, stop me if I define anything inaccurately.”
Carl assured us that he would, and Bill continued to educate us.

“A Gene,” he said, “is a piece of DNA which codes for a particular feature. For example, the gene for eye color in people, or the gene for the color of those worms we talked about that got eaten by crabs.
“Alleles are Variations on the same gene for a feature. For example, the alleles for eye color are the gene for blue eyes, the gene for green eyes, the gene for brown eyes, etc. Or for worms, the gene for blue skin, pink skin, yellow skin, purple skin and red skin. Same gene, you know, because they code for the same feature, worm skin, but different alleles, you see, because they code for variations on that feature.”
Tom indicated that he understood, and Carl made no indication that these facts were false, and so Bill gave us a few other relevant facts.

“Frequency,” he said, “is how often something happens as a percentage of the total things happening.”
“For example,” interjected Carl, “if the gene for blue skin shows up in 1 worm, in a population of 5 individuals, then the allele for blue has a frequency of 1 in 5, which is 20%.
“100% of the population has *a gene* for skin color. In that population, 20% has the allele for blue, and the other 80% has alleles for pink, purple, yellow, etc. Thus, a change in allele frequency would be a change in the percentage of one particular allele in a certain population.
“So, if four more blue worms are born,” Carl continued, “and a second yellow, there would be ten total worms. So now blue is 50% of the population, yellow is 20%, and pink, purple and red are each 10% of the population. Between these two generations, there has been a clear change in allele frequency. The population has evolved.”



Carl looked to me, and I shrugged. “It’s changed, but it hasn’t *Darwinian* evolved.”
“Hang on,” interrupted Blue Beard. “Last time the blue ones got to be most of the population because the others got eaten by crabs. Now they’re most of the population simply because they had the most babies?”
“It doesn’t matter why the frequency changes,” said Carl. “It can be because of birth rates, mutations, death from predators, diseases, or even just members migrating to another place and joining a different population. All that matters is that the allele frequency in a population changes over time.”
“Now that we get the idea, let’s see how it fails,” I said. “When the percentage of a gene in a population changes, no new genes are made. Even worse, this can indicate the loss of a gene.”
“For example,” offered Tom, “if the percentage of blue worm individuals in a population went from down from 20% down to 0%.”

“Exactly,” I replied. “But the thing to remember here is, **this is a statistical change, NOT a genetic change**. Having more or less of something which already exists does NOT bring something new into being. Having more or less of a gene which already exists does not make new genes. Genes that exist now did not come into being because, before it existed, other genes became more or less frequent in a population. Thus, a change in allele frequency is NOT evolution.”

“Oh, bother!” shouted Blue Beard. “We’ve already talked about this one! Carl, you half wit! A change in allele frequency has nothing to do with making new genes! It’s census information! You’re just counting noses! Or the genes that make noses.”

“What if that change is from 0% up to 20%?” asked Carl. “Doesn’t THAT mean a rise in genetic information, and thus evolution?”

“Not if the change is due to migration/genetic drift,” I said. “Just because a gene did not exist in a particular population does not mean it did not exist in ANY population. If you merely move it from one population to another, you do change the frequency from none to some, but only in an isolated population. If you consider the entire planet, then the frequency of any gene cannot change merely by moving about on the planet.”

“Seriously, Carl, you scurvy bumpkin!” continued Blue Beard. “On your worthless definition, you can say the west side of the block has evolved if you ignore the east side and somebody moves across the street! You really want to tell us we should believe that bacteria became wolves and cabbages by moving from one side of the pond to the other?”

“This is the biggest reason why definitions like the one Carl offered fail,” I suggested, “and why genetic drift and changes of allele frequency fail as mechanisms of evolution. No new genes have come into existence. The only way this would be an evolutionary change is if there was a new gene created, and merely by definition, it CANNOT be created by a change in gene frequency. Frequency is merely counting. You can’t create new genes by counting genes.”

“That’s true,” noted Tom. “A change in allele frequency would not be able to cause new genes to come into being. The creation of a new gene could cause a change in allele frequency. Your definition confuses the cause and effect relationship and puts the effect before the cause.”

“Whose side are you on?” demanded Carl.

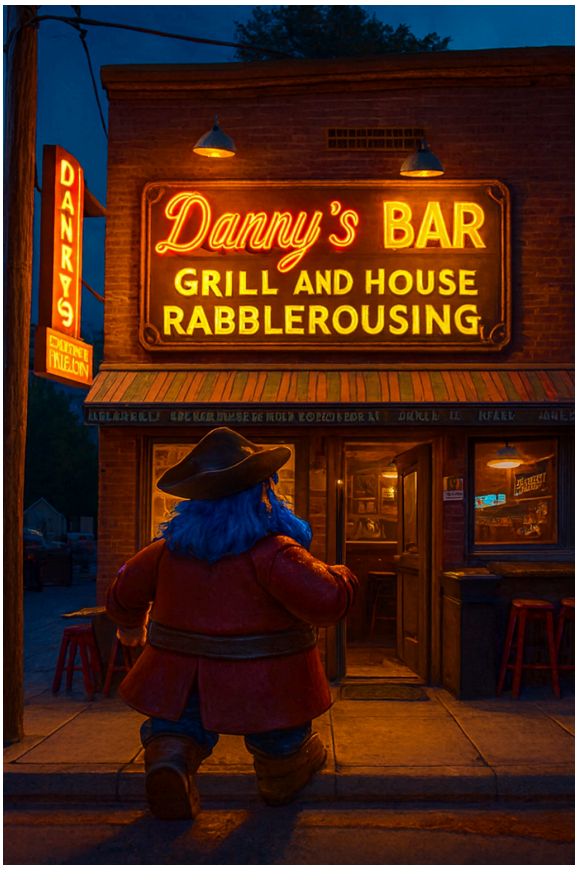
“What?” asked Tom. “I’m just saying that you.. uh, that website you quoted must have not considered all of the facts.”

“That definition,” said Carl through gritted teeth, “is a very common one! I’ve found it on lots of web sites and in lots of books!”

“But it is not the science of rockets,” I said. “Try it with anything. Start with six tacos and six burritos. So far your day is off to a great start. Count them all. What’s our taco frequency, Tom?”

“You will find you have a 50/50 split,” he said. “Your population is 50% taco.”
“Now,” I continued, “bring over a chicken enchilada and pork chimichanga from another table. There has been migration, or Tex Mex shift.” I looked to Tom.
“There are now 14 items on your table. Your chimichanga frequency has risen dramatically from 0% to 7%. Your Tacos have dropped from 50% to 43%,” Tom informed us.
“Carl, can we explain the existence of that chimichanga by this dramatic increase in its frequency at our table?”Carl did not reply. “Or can you make guacamole by lowering the tacos from 50% of items to 43%?” Carl, again, did not reply, so I did for him. “NO. For that you need to add avocados. When the tacos become less than 50% of the table, it doesn’t cause avocados to come into being. It was bringing over two more items that caused a change in taco frequency, but it will never cause guacamole, no matter how many tacos we bring over or send away.”
“I think the metaphor breaks down here,” observed Bill, “but it gives me a good idea of what I will be having for lunch tomorrow.”
“Not to dumb it down too much,” I said, “but a process which does not MAKE new genes, does not MAKE new genes.”
“Even though he doesn’t share your fanatical, religious rejection of science,” laughed Blue Beard, “I’ll bet even Carl can agree with that! Counting something doesn’t make anything,” he said to Carl. “If it did I’d be on me ship, counting my doubloons!”
Before we could continue our discussion, we were met with something we can always count on, Wendy coming to our table with a great mountain of Nachos. The discussion thus halted for the consumption of Mt. Fiesta, and we would continue it another day.

Defining Evolution 12: Descent with Modification



It is the day of days! By which of course I mean, Thursday *(Formerly Thor's Day, but we're no longer allowed to call it that without paying royalties to McDisneyBucks, very similar to THE BIG GAME which everyone refers to privately as the Bowl Which has the Properties of Superness, that being its name, unless they are advertising snacks for THE BIG GAME- but I digress)*.

The reason it is the day of days is because it brings with it a pile of Nachos which reaches to the heavens! Emotionally I mean.

Scientifically I think that would be impossible, but again I digress.

While our Thursdays are often full of jokes, songs, darts, pool, and movie reviews, the past several of them have started off being about an ongoing conversation which started almost as a fight. Carl and I were about to argue about whether Darwinian Evolution is or is not a fact of science, when our good friend Bill suggested we define what it is. I came up with what I feel is the world's first clear and very useful definition of Darwinian Evolution, and for the last couple of weeks we've been using it to examine the claims of evolutionarily biased textbooks to see if we can determine which position, Carl's or mine, is the correct one. If you have been reading the goings-on regularly, then I suppose that this is the paragraph you would be just as well to skip, since you know all of this already, were it not too late.

It was on this week, root beer in hand and Nachos in our near future, that Carl opened the friendly proceedings with what he felt should be accepted both as a definition for "Darwinian Evolution" as well as a mechanism of said Evolution, sure to produce the history described in the Tree of Life illustrations.

“Descent with Modification!” Carl said.

The rest of us sat waiting for him to continue, and he looked back at us, somehow thinking he had said enough.

“Descent with modification!” he said again.

“What about it?” asked Captain Blue Beard.

“It is a good definition and a very obvious mechanism of Darwinian Evolution!” said Carl.

“All right. ‘Splain,” said the Captain.

“Well, it simply means that each successive generation of plant or animal is a little different than the previous one. Over time, these little differences add up into big differences, and that’s how worms become fish, or some such thing. Descent with Modification!”

I’m not very practiced in eye rolling, but here I felt protocol required it, and so I gave it a shot. “When figuring out what is wrong with an idea,” I said, “sometimes it is merely that the idea is too fuzzy to be seen. Here in lies such a fuzz.”

“I’ve just told you what it means,” said Carl in a huff.

“You’ve said a little,” I replied, “but not enough. If by descent with modification we mean that

> **Evolution is an unguided, Natural process which increases the genetic information in an organism; Creating new Genes which did not previously exist.**

These new genes then cause an increase in physical complexity and associated behavior, Both of which increase the organism's ability to survive and pass on these traits to offspring,

then I agree. However, *modification* doesn't really mean anything but *change*. If I replace a flat tire on your car, I have modified it. If I slash all four ties with a sword and pour pancake syrup into your gas tank, I have modified it. But, and I'm no car expert here, I suspect those modifications are not of equal value. A cow may give birth to a new generation of cows. Of those cows, one may be born with no eyes, and another born with five legs. These are modifications, but they are not equal. Also, these are not evolutionary changes."

"Of course they are evolutionary changes!" bellowed Carl. "Each generation is different than the previous! How are you going to make changes as big as additions or losses of eyes and limbs without Evolution occurring?"

"Chainsaw?" suggested Captain Blue Beard.

"Not the point being made, Captain," said Bill. "Let's consider the genetic issues. A cow may HAVE the genes for eyes, but it is not expressed. Thus, a cow with no eyes may not be genetically different than a cow with eyes, just as a baker with a cake and a baker with no cake may have the same recipe, only the first baker has actually MADE a cake and the second merely has the instructions for doing so. A cow with five legs has a corrupted gene which should have made four legs but made five instead, just as a baker who reads an order for a dozen muffins twice will make two dozen muffins. It doesn't add any ingredients to the recipe, and it's not new information. It's an error in applying old information."

"I don't know," said Tom. "I still don't see why descent with modification wouldn't work. Given enough time, small changes could accumulate into large ones, could they not?"

Blue Beard reached into his great red coat and pulled out his deck of poker cards. “Shuffle a deck of poker cards” he said, demonstrating for emphasis, “and you can get more than TWO MILLION different five card hands.” He dealt out a few five card piles to make his point. “But you can shuffle and deal for a billion years and you will never create a new card that way. You’ll never make the Archduke of Hearts by shuffling and dealing. Is each hand different? Sure. Is each hand very different from the original deck it was dealt from? It sure is. Does that create new cards, or explain where the cards came from in the first place? Nope.”

“So if we apply your cards to the real world,” suggested Bill, “then we have a population which has a total of fifty two alleles in the gene pool, and each member expresses five genes. This means you can have two million unique individuals, perhaps over two million generations, before you must make a combination of genes which already existed in the species.”

“And in those two million generations,” said Blue Beard slapping an Ace of Spades onto his forehead, where it stuck, “you never have the creation of a new card. Every member of the two million generations carries only the genes which existed in the original parent.”

“Just as dogs,” I interjected, “all carry genes which would have been present in the dogs aboard Noah’s Ark four thousand years ago. The hundreds of varieties of dog that exist now are just those same genes disseminated and sometimes lost.”

“Here’s an example I’m sure Carl is familiar with,” said Bill gazing into his mobile computation device. “The Finches of the Galapagos Islands, often called Darwin’s Finches. What do you know about them?”

“Well, it’s a short term study,” said Carl, “but it is a textbook example of what I am talking about. The Finches have a wide variety of different sizes of beak. Once can track the average beak size and see how it changes with the available food on the islands, which itself changes with the amount of rain in a given year. These changes are small, but given enough time will surely add up into big changes - what we call a speciation event - where the birds will be so different that they will not all be Finches anymore. They will have evolved into new species.”

“And this is a real example?” asked Tom. “This is something we observe?”

“Something we’ve been observing,” said Carl, “for many decades now. Evolution happening before our very eyes!”

“Your brain is a marvel of modern science,” said Blue Beard, his words dripping both with sarcasm and root beer. “That you continue living while you apparently left it at home. First, you haven’t given us evolution happening before anyone’s eyes, you’ve given us your faith that SOMEDAY evolution will happen.”

“It’s decent with modification!” replied Carl brashly. “We have been tracking the kind of changes that will add up into the big changes your tree of life requires!”

“That so?” asked Blue Beard rhetorically. “Hey Bill, what does your research say about the cumulative changes in these magical birds?”

“Cumulative changes?” asked Bill.

“Yeah. How much have their beaks changed since Darwin was there his self.”

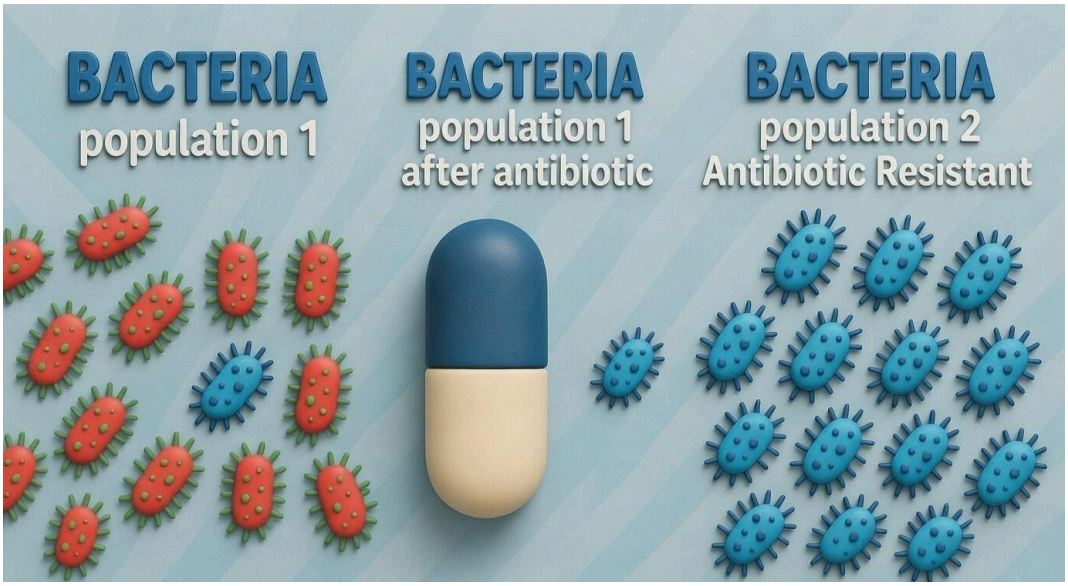
“Well, there is no *cumulative* changes,” said Bill. “There are variations with the different seasons, but then the populations change back when the weather changes again.”

“So, let me get the details right,” said Blue Beard with a glint in his eye. “We have, when Charlie D was there a hundred some years ago, Finches with big beaks and little beaks. Right?”

“That’s right.”

“And today we have Finches with big beaks and little beaks, right?”

“Yes, that’s right.”
“And these changes in the population we see are an increase in one of those varieties, depending on a change of environment, which swings the other way when the environment swings the other way. Isn’t that right?”
“Yes, yes?” said Carl. “And what is your point, Blue Beard?”
“My point, you half wit,” said Blue Beard, “is that this is no different than your stupid Peppered Moth example! You got two variety of something. One is more popular, and then the other is, and then the first one is again. Nothing gained. Nothing lost. Nothing EVOLVED you barnacle encrusted goober!”
“What do you mean?” replied Carl, his face getting red. “Of course they evolved! There was decent with modification! Each generation is different than the one before!”
“Blue Beard is right, Carl,” I said. “Just like the Peppered Moths, this is merely an exercise in tracking the more popular variety, but this will never create a new variety. What we’ve learned by tracking these birds is that they all interbreed, making them one species, and the changes in generations don’t add up across time. They merely oscillate. There never will be a speciation event according to the data we have. This, once again, is why Decent with Modification fails both as a definition and as a mechanism of Darwinian Evolution.”
“But there are a lot more examples,” offered Tom. “What about SUPERBUGS? Those bacteria which resist antibiotics?”



“Those result from a loss of genes,” I answered. “In any population of bacteria, there might be a few which have something broken. The bacteria which aren’t killed by antibiotics are lacking the ability to make an enzyme, or the ability to bring the antibiotic chemical into the bacteria. It’s like having a house with doors that can’t open. When the postman is delivering bombs, you survive because you couldn’t open the door to get

yours. But your house hasn't gained a new feature, it's lost the use of a previous one. This is the exact opposite of evolution."
"What about Nylonase?" said Carl. "That bacteria which can digest nylon when previous bacteria could not? Surely that is an example of evolution in action!"
"I'm not familiar with that germ," I admitted. "Bill, what do you know?"
"Nylonase is a bacteria which seems to have developed the ability to digest nylon, which is something previous generations of bacteria couldn't do."
"There!" said Carl triumphantly. "You see? Evolution in action!"
"Sorry Carl," said Bill. "Those result from duplication of previously existing genes, NOT from the creation of a gene which did not exist. To follow the previous metaphor, this is like the builders making your house with two front doors when the original blueprint only called for one. It's a duplication of something which already existed. It means you can take in twice as many delivered pizzas."
"It's still a new feature created by a genetic change!" said Carl. "Even by his definition, that is evolution!"
"My definition," I explained, "calls for the creation of new genes which did not previously exist. You will never get a new gene by duplicating an already existing gene."
"Just as you won't get a house," said Blue Beard, "by installing more doors than was called for."
"What about Poodles," asked Tom, "and Chihuahuas and other dogs which didn't exist until recently? Aren't there new genes somewhere in all of those hundreds of varieties of dog which we know did not exist until recently?"
"Those dogs," I replied, "and in fact, all 400 varieties of dog, are the shuffling and losing of genes from an ancestral dog population. Never do we see NEW genes for NEW features and behaviors."
"This is one of the reasons," added Bill, "Pure Breeds are riddled with problems. They didn't develop new features, they lost old ones. Poodles can't shed, which means they can easily overheat. Poodles are a genetic nightmare."
"Besides that," said Blue Beard, "all of them dogs were bred by persons with some goal in mind. Dogs for hunting, dogs for guarding, dogs for being used as throw pillows or as accessories in oversized purses. None of them were made by natural processes. So this, again, tells us about the genetic diversity existing in the dog kind, but not about what nature would do left to herself."
"So, what are we saying about Descent with Modification?" asked Bill.
"It's no different than Change over Time," I said. "Merely because of the fuzzy nature of it, I am saying that Descent with Modification is NOT evolution, and for the same reasons I will say "Putting metal parts together" is not synonymous with "Auto Manufacturing." If you have a problem with that, you can do something with it, and put it in a place."

“Well, my place is about to be full of Nachos!” exclaimed Blue Beard, making note of the approach of Wendy behind our pile of dinner.
“By ‘place,’ I hope you mean your mouth,” said Bill.
“I hope so too, lad!” And Blue Beard laughed loud and long, until Nachos were shoved into his place.

While the night would be full of games and laughter, I could tell by the look in Carl’s eyes that the conversation was not over. Another Thursday would meet us soon.

Defining Evolution 13: Vestigial organs

Another Thursday had come and gone, and we had fought our way valiantly through meetings, paperwork, and office coffee. We had scaled the cubicle walls in marketing department sieges and taken many prisoners in the form of sticky notes and ball-point pens. We had worked through lunch with only some microwaved left-overs to sustain us, and we came to Danny's Bar, Grill, and House of Rabblerousing anxious for our enormous pile of Nachos.

Despite our hunger for Nachos, we also came with a hunger for science, though of a metaphorical kind. We didn't intend to eat any science. But I suspect you knew that.

A few weeks back I had presented the world, including my four friends around the round table by the dart board, with the very first clear and very useful definition for Darwinian Evolution, and had since been using that definition to examine the various proposed mechanisms of Darwinian Evolution. On this night, Carl had come with what he felt was a sure fire nail in the coffin for my denial of Darwin, and launched right into it as soon as each of our hands held a frosty root beer.

"I've got something which I think will change your tune," Carl said, implying my personal tune. "As you have said many times, science is based on observation, and so I have a mechanism of evolutionary change which is easily observable in the present- even in our own bodies."

“If we need to look into one of our bodies,” said Captain Blue Beard, “my cutlass is out in the truck. And I volunteer Tom to be cut open.”
“Hey now!” objected Tom.
“Nothing against ya, Lad,” explained Blue Beard, “but Carl is the one doing the explaining, so he needs to be in one piece, Bill is the doctor, so he’d need to assist with the cutting, and Rent-A-Friend tends to be a real whiner about these things.”

“No one is getting cut open,” I insisted. I was upset, but the fact is, he was right. I tend to be a whiner when it comes to being cut open with a cutlass.

I don’t think that makes me less of a man, but we all have our peculiarities.

“I meant,” clarified Carl, “that we can learn about evolution from the inner workings of the human body. Our bodies, and many other organisms show evidence of evolution because of the existence of vestigial organs.” He smiled smugly. “Do I need to explain vestigial to anyone?”

“For Pete’s sake,” said Blue Bleard, “of course we know what vestigial is. They’s the parts of a sleeveless upper body garment.” He looked around for moral support and instead saw four of his friends wide eyed, waiting for a punchline. “That’s not it then?”
“Do you mean Vest?” I asked.
“Well, Vest is the noun form,” Blue Beard explained. “Vestigial is the adjectival form.”
“No, you seafaring flea circus,” said Carl. “A vestigial structure, and this definition is straight from the UC Berkeley Evolution website*, is a feature that *was* an adaptation for the organism’s ancestor, but that evolved to be non-functional because the organism’s environment changed.”
“*Evolved to be non-functional!*” I said with a laugh. “How’s that for New-Speak? Now something formerly useful becoming useless is evolution. Those guys could do spin for the White House and report how great the economy has become since so many

persons formerly burdened with employment have been promoted to a home based, unscheduled, non-for profit position."

"I figured you'd be quick to reject even something so observable in defense of your religion," said Carl with a sneer. "But let's face the facts. We see vestigial organs and structures in lots of living things. There are fish living in caves whose ancestors had eyes, and because of natural selection, the cave fish no longer do. That's a genetic change over time which has led to a new species. Furthermore, even the human body has vestigial structures, unless you want to claim that God made useless organs like the appendix, whose only function seems to be to get infected and need to be removed."

"So, Carl," I said, "let's clarify. Vestigial organs are organs or other structures which, we suppose, USED to do something, but now don't, or even more drastically, have been lost entirely."

"That's right," he said. "Evolution has taken away function and structure, showing a change through time. Descent with modification."

"Change over time and descent with modification," I repeated, "both of which are definitions for Evolution we've already seen to be intellectual failures."

"I don't know if you failed math back in grade school," said Blue Beard, "but losing something a little or a lot doesn't MAKE anything NEW. You can't ADD by SUBTRACTING!"

"Our pirate pal is right again," I said. "Nothing which exists does so merely because something else stopped existing. Thus, this is NOT evolution, and at this point I start to wonder why evolutionists bring it up. It really seems like grasping at straws."

"You guys are just upset that I have found observable scientific evidence of evolution having happened," said Carl. "You tell me, did the appendix have a use in our evolutionary past, or did God make some junk that doesn't do anything but cause us to need surgery to remove it?"

"Carl," I said with wonder, "you are the king of logical fallacies - or, what I like to call Flawgical thinking."

"Name calling doesn't change the facts," replied Carl.

"Not name calling, my friend," I said. "However, you have presented a classic false dichotomy."

"What's a false dichotomy?" asked Tom.

"It simply means," I explained, "that he has presented two options as the only two options when there are in fact more options."

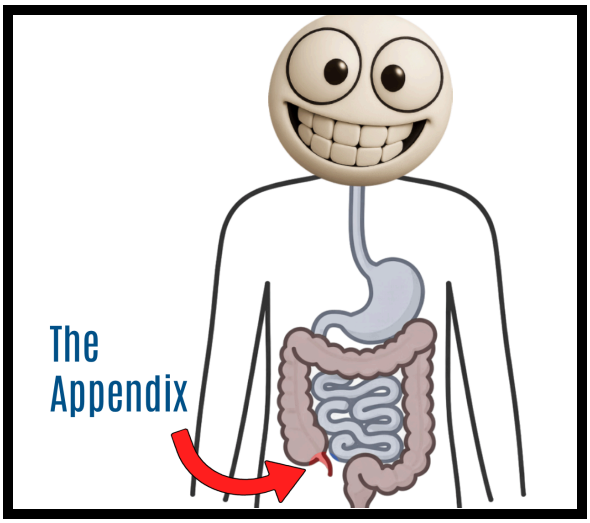
"What other options?" demanded Carl.

"The first one you didn't think of is, maybe God created it with a function which it has since lost. Just because something is malfunctioning today, doesn't prove God made it that way."

“I was thinking the same thing,” said Bill. “For example, the pancreas, you know, can stop making insulin. And if it does, you see, you become diabetic. But that doesn’t show that the pancreas had no purpose when it was made. It shows that the world has been falling apart like Blue Beard’s pick up truck.”

“Now, now,” said Blue Beard. “I figure if my truck loses enough parts it will become one of those fancy hybrids I keep hearing about!”

“Well, fine!” said Carl, unimpressed. “If you want to believe that God exists and He made everything, then you can pretend it’s possible that the appendix did have a function, but I was basing my options on things we can observe. That’s what science does.”



“In that case,” I replied, “you still should have one more option.”

“What option?”

“The Appendix DOES have a function,” I said. “It’s not vestigial at all. Like the dozens of other alleged vestigial organs in the human body we now know the uses of, it has a function because we were designed by a brilliant designer.”

“Ridiculous!” said Carl. “Everyone knows that the Appendix is a vestigial organ which doesn’t do anything in the human body! I’ve got a college biology textbook which says so!”

“I don’t doubt it,” I said. “I’ve got one as well. But I’ve also got two quotes on the subject which show how unreliable textbooks can be. The first comes from in the October, 2010 issue of Natural Geographic, in an article called *Vestigial Organs Not So Useless After All, Studies Find:*

> ***“The appendix, a narrow tube that hangs off one end of the colon, is probably the most famous “junk” organ. But it’s turned out to be important even today—in certain circumstances.”***

“So maybe it does something,” said Carl with a shrug. “What does that prove? There are still lots of other vestigial organs.”

“First it proves that Evolution has been surfing a wave of ignorance and lies since the beginning,” I said.

“Just because a textbook doesn’t have the latest medical research,” said Carl with disdain, “doesn’t mean they are lying when they present the Appendix as Vestigial.”

“I thought you would say so,” I said, “and so I have a few more quotes on the subject:

> ***"For at least 2,000 years, doctors have puzzled over the function of the thymus gland. Modern physicians came to regard it, like the appendix, as a useless, vestigial organ, which had lost its original purpose, if indeed it ever had one. In the last few years, however… men have proved that far from being useless, the thymus is really the master gland that regulates the intricate immunity system which protects us against infectious diseases… Recent experiments have lead researchers to believe that the appendix, tonsils and adenoids may also figure in the antibody responses."***
>
> **"The Useless Gland that Guards Our Health", in Reader's Digest, November **1966**.*

NINETEEN SIXTY SIX! *That's more than a decade before I was BORN! But wait! Look at the date on THIS ONE:*

> ***"There is no longer any justification for regarding the vermiform appendix as a vestigial structure ."***
>
> ** William Strauss, Quarterly Review of Biology (1947), p. 149."*

"1947!!!" exclaimed Blue Beard.

"That's only, what? TWO YEARS after World War Two! Right?" said Tom.

"Did YOU hear this in high school?" I asked. "Because my textbook left this out and taught the EXACT OPPOSITE."

Carl has nothing more to say on the subject, so I gathered from the fact that he had folded his arms and chosen to stare away from us toward the kitchen.

"How would we know something is *Vestigial*?" asked Tom.

"The process is simple," I answered. "First we assume evolution is true. Then we assume that the organ or structure in question has no purpose now. Then we assume it had a purpose in the evolutionary past and has *'evolved to be non-functional.'* Then some idiot creationist comes along and suggests that the structure HAS a function, like the appendix or spleen or tonsils or thymus or coccyx… and dang it he's right. So we take those off of the list of vestigial items and keep on believing in evolution."

Blue Beard laughed out loud, but Tom seemed uncertain.

"But what about those cave fish?" he asked. "Here, I found this," he said pulling out a print out from his man bag, "on an evolutionary web site*." He read the following to us,

> ***"Fish species that live in completely dark caves have vestigial, non-functional eyes. When their sighted ancestors ended up living in caves, there was no longer any natural selection that maintained the function of the fishes' eyes. So, fish with better sight no longer out-competed fish with worse sight. Today, these fish still have eyes — but they are not functional and are not an adaptation; they are just the by-products of the fishes' evolutionary history."***

"This is a great example of something which could actually be argued to be vestigial," I admitted. "If you remove the claim that this has anything to do with evolution, then I

agree with this paragraph. It is an example of a non-functional organ which was previously functional - and is a kind of change we have witnessed within a few generations, thus making it observation based science. But there's no bait and switch without the bait.

"The problem is THIS IS STILL A LOSS! These fish have LOST the use of their eyes. In fact, some studies show they still retain the DNA information it took to make eyes, but those genes are switched off."

"There are lots of examples of living things with genes that do not get used," Bill added. "When the conditions are right, the genes can get switched back on. This is why pasty, colorless Europeans get tan when exposed to sunlight; the gene that produces melanin gets kicked on when they are exposed to lots of sun."

"Hey!" said Blue Beard. "I resemble that remark."

"Is that enough of a genetic change to be considered Evolution?" asked Tom.

"This is not evidence of evolution," I said, "as evolution requires a GAIN OF GENETIC INFORMATION. Turning genes off is NOT evolution anymore than parking your car makes you Henry Ford. Discovering fish no longer have functional eyes tells us NOTHING about where the functional eyes had come from in the first place, and that is what Evolution is supposed to be able to explain."

"And finding a gene has been switched off," added Bill, "doesn't do anything to prove the genes came about through unguided, natural processes."

"Not to beat a dead horse," said Blue Beard to Carl, "but how many parts of a fish you figure need to stop working before the fish becomes a lizard? Maybe next week I'll bring a fish and a pair of scissors and we can find out?"

Carl offered no reply.

As our Nachos approached the table, I made the suggestion, "If we all work together to spread the word, I think we can educate even the writers of biology textbooks and National Geographic, and maybe, just maybe, they might change their tune. All they need is the truth. And fifty or sixty years."

Wendy's approach signaled the end of the conversation for the night, but not for good. We would not rest, I was certain, until we had looked under every metaphorical rock for the truth. In the meantime, we had Nachos to scale.

**http://evolution.berkeley.edu*

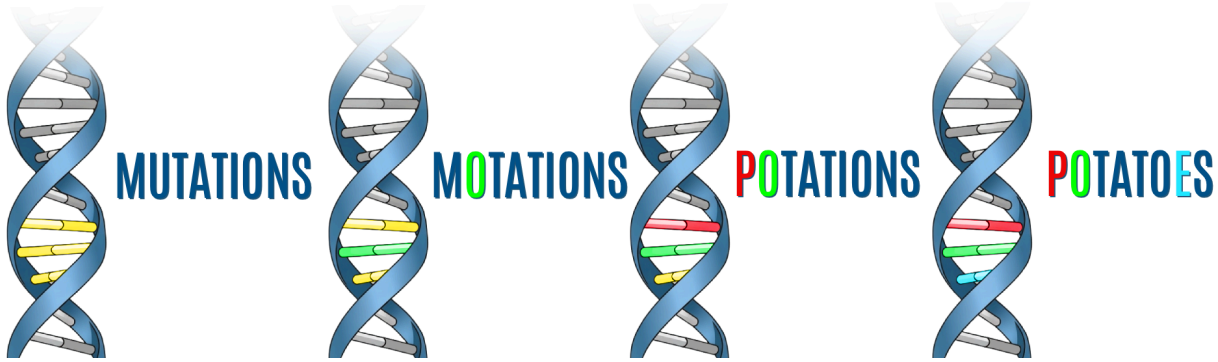
Defining Evolution 14: Mutations

My friends and I had made it to the end of another Thursday, and met once more at Danny's Bar, Grill, and House of Rabblerousing to celebrate with a mound of Nachos and all the root beer we could consume.
When I arrived, Bill, Tom, Carl, and Captain Blue Beard were already at the round table near the dart board, and our affable waitress, Wendy, had already left for me a frosty mug of suds. As I greeted my comrades,
I discovered that something was strangely amiss about the countenance of my friend Carl.

It wasn't a new haircut. He wasn't wearing glasses. Then it hit me. *He was smiling*.
"What ho, Carl," I said. "Was your Thursday a rousing success?"
"Not in terms of my profession," he replied, "but I have been looking forward to this get together."
"Glad to hear it," I said. "I'm awfully hungry myself."
"Something hit me this morning as I was brushing my teeth," said Carl.
"I do most of my best thinking when I'm brushing my teeth," said Blue Beard.
"I didn't know you brushed your teeth," joked Tom.
"Oh, now that's just hurtful," replied Blue Beard. "I'll have you know I brush my teeth at least once every week whether I need to or not."
"Anyways," said Carl. "I was thinking about your definition of Evolution…"
"You mean this one?" I said, pulling the note card out of my pocket and reading,

> **"Evolution is an unguided, Natural process which increases the genetic information in an organism;**
> **Creating new Genes which did not previously exist.**
> **These new genes then cause an increase in physical complexity and associated behavior, Both of which increase the organism's ability to survive and pass on these traits to offspring."**

“Yes,” said Carl, his smile fading quickly. “That one. I was thinking about it and I realized what it was that is really being described. It is in fact a primary driving mechanism of evolution which is observable and for which we have decades of evidence in the lab and in nature.”
“You’re talking about mutations?” I asked.
Carl’s mouth fell open and his eyes went wide. “Well, yes. Yes, I’m talking about mutations.”
“Well it’s about time,” said Blue Beard.
“Personally,” said Bill, “I expected you to bring this up weeks ago.”
“Yeah,” said Blue Beard. “It’s like you ain’t been paying no attention around here.”
Carl, his mouth still open, looked at Tom. “I kinda expected you to bring it up too,” Tom admitted. “Like, weeks ago.”
“Then why didn’t YOU bring it up weeks ago?” asked Carl.
“I figured if there was anything to it,” explained Tom, “you would have already done so. Besides, I don’t really think about this Evolution stuff at home or at work.”
“So come on now, Mr. Johnny-Come-Lately,” said Blue Beard. “Let us have the scientific wonders of Evolution by Mutations!”



“It would seem you all already know about mutations,” said Carl through a sneer.
“Well, a’ course we do,” said Blue Beard through a smile, “but it would mean so much more coming from you.”
Carl pulled out his notebook and flipped it open to the page he had prepared for the night. “Just to make sure we’re all on the same page,” he said, “I’ve got scientific definitions from UC Berkeley's Evolution website*;

> ***“Mutation is a change in DNA, the hereditary material of life. An organism’s DNA affects how it looks, how it behaves, and its physiology — all aspects of its life. So a change in an organism’s DNA can cause changes in all aspects of its life.”***

“Oh, good!” I said. “They included behavior. A lot of evolutionary sources tend to forget about that.”
Carl looked at me with low brows, but chose to keep reading;

> ***"Mutations can be beneficial, neutral, or harmful for the organism, but mutations do not "try" to supply what the organism "needs." In this respect, mutations are random — whether a particular mutation happens or not is unrelated to how useful that mutation would be."***

"Is that it?" asked Blue Beard.

"Almost," said Carl. "I've got one more useful quote to help you all understand what Mutations are. Here it is,

> ***"Most of the mutations that we think matter to evolution are "naturally-occurring." For example, when a cell divides, it makes a copy of its DNA — and sometimes the copy is not quite perfect. That small difference from the original DNA sequence is a mutation."***

Carl looked up with a hint of triumph in his eyes and said, "So when you put it all together, they are explaining that these random mutations which we see happening all the time are in fact the unguided, Natural process which increases the genetic information in an organism; Creating new Genes which did not previously exist, and blah blah blah."

"Ooh," said Blue Beard. "Did you see that? Brought it full circle for once! Nicely done Carl."

"I can't tell if you're being sarcastic," admitted Carl.

"To be honest," said Blue beard, "I have the same trouble sometimes. But in this case you actually made an attempt to be relevant to the discussion! It's a nice change of pace."

Carl, seemingly unsure if he was being complimented, sank back into his chair with a quizzical expression. "Yes, well, I think the point is that, even using your own definition of Darwinian Evolution, we now have an observed mechanism which makes Evolution occur."

"Just to bring home the importance of mutations," added Bill, "I also have a quote on the subject;

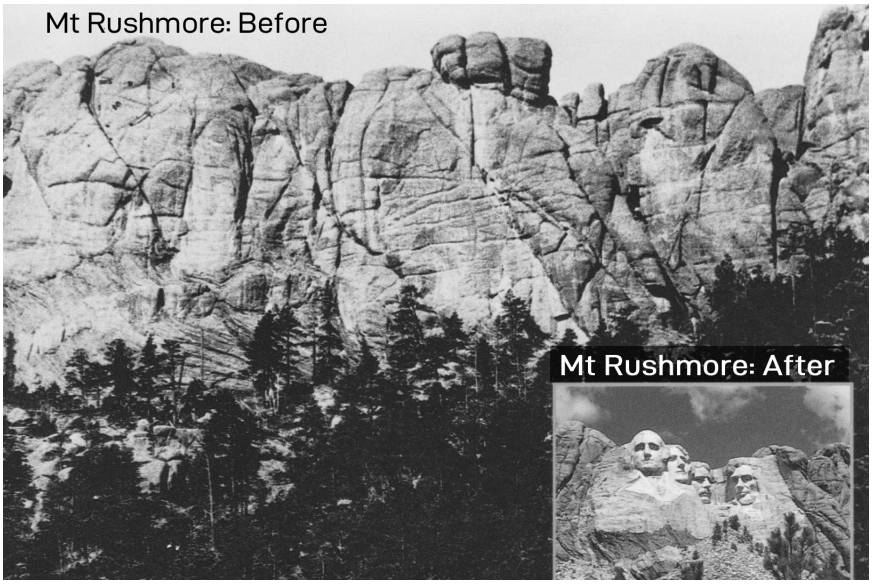
> ***"It must not be forgotten that mutation is the ultimate source of all genetic variation found in natural population and the only new material available for natural selection to work upon."***
>
> **E. Mayr, Populations, Species and Evolution (1970), p. 103*

"Boy," I said, "it sure sounds like mutations are important to evolution, eh guys? It sounds like, if mutations aren't making new genes, then there's no evolution at all!"

"So I think," said Carl looking at me, "this should be the part of the conversation wherein you finally agree that Darwinian Evolution is not only possible, but is an observed fact of science."

"Oh, my dear Friend, Carl," I said. "I hate to ruin a good day for you. To be honest, I rather enjoyed seeing you smile for once."

“Then concede, dear boy, and I shall smile some more.”
“Unfortunately, I can’t do that, Carl. The problem with mutations is that they are a hypothetical, fictional mechanism of Evolution, but not an actual one.”
“What are you trying to say?” asked Carl. “Are you saying mutations don’t happen?”
“Not at all,” I replied. “What I’m saying is, they don’t create new genes. They destroy old ones.”
“Nonsense.”
“Let’s start at the very beginning,” I said. “A very good place to start. First of all, consider Mount Rushmore.”
“Don’t change the subject,” objected Carl.
“Not changing the subject,” I said. “But as you know, I talk with my hands and in word pictures. Mount Rushmore started off as a mountain like a lot of others. It’s made of rock, and that rock has certain properties. One of those properties is that it is not invincible, and thus parts of it can be cut, clipped, worn, or blasted off. Left to itself with no human intervention, the effects of the weather would have eroded the side of the mountain so that it changed shape. Would we all agree?”
“Well, of course,” said Carl. “But what does this have to do…?”
“It’s a metaphor,” I explained. “And what kind of erosion was it that resulted in the side of the mountain becoming a very good likeness for not one but four of our past American leaders?”
“None, obviously,” said Carl, his annoyance growing.



“Hold on now!” I said. “Are you saying erosion doesn’t happen?”
“Well, of course it happens!” he blurted out. “But erosion will never carve a mountain into the face of George Washington! Why are we even talking about this?”

“But turning the mountainside into George Washington’s face was just a matter of removing rock, which can be done slowly over time,” I pointed out. “Can’t erosion remove rock slowly over long periods of time?”
“Yes of course, but…”
“And hypothetically,” I continued, “if the right pieces of rock were removed the result could eventually be the face of a former president, right?”
“Hypothetically,” said Carl, “but it will never happen!”
“Well then,” interjected Blue Beard, “how do you explain the fact that there are four former presidents carved into the side of Mount Rushmore if erosion didn’t do it?”
“You idiot pirate!” shouted Carl. “A team of men worked for years to design and carve those faces! Erosion will never make anything as complex as a human face!”
“Nonsense,” said Blue Beard. “Given enough time, anything is possible, and I say it were erosion what carved them faces. This story of yours about an artist and his team of magical men carving it is silly and unscientific.”
“Unscientific?” sputtered Carl.
“Certainly!” shouted our pirate friend. “Geology, chemistry, and physics all tell us that erosion can wear down rocks and create lots of shapes. I dare say there are no shapes that erosion is incapable of making. I admit that it seems unlikely that those shapes would add up to become President George and friends, but as there is only one Mount Rushmore, it only had to happen once.”
Carl was too flustered to answer, so Tom stepped in. “Even though I’m pretty sure Blue Beard is just trying to get a rise out of Carl, which we’ve come to expect, I’d still like to point out that we’ve gone pretty far from the original topic.”
“Because they refuse to admit that they’ve been beaten!” shouted Carl. “They have to change the subject to rocks and national landmarks or they’ll have to admit that I’ve shown that Evolution is a scientific fact!”
Blue Beard had sunk into laughter and had nothing to add.
“Tell the truth,” I said to Blue Beard. “You actually knew where I was going with this, didn’t you?”
“Totally,” he admitted. “But Carl here still hasn’t figured it out.”
“Wait,” said Tom, “you were making a point?”
“Well, I like to see Carl’s face turn red, I admit,” said Blue Beard. “But the metaphor is simple. Just because something isn’t logically *impossible*, doesn’t mean it will ever be *actual*. The reason design implies a designer is because the opposite is so unlikely as to be impossible.”
“Let me give it to you in math terms,” said Bill.
“Thank you,” said Tom.
“Can you flip a coin so it comes up heads *a thousand times in a row*?”
“No,” said Tom. “The odds of that happening would be…”

“Hold on now,” said Bill. “I didn’t say WILL you flip a coin so it comes up heads a thousand times in a row. I said, CAN you?”

“Well… it is a hypothetical possibility,” said Tom. “There is nothing in a coin which would make it actually impossible. But the odds against it happening are so great that it may as well be impossible.”

“Can we please get back to talking about mutations?” insisted Carl.

“We’ve been talking about mutations,” I said. “Metaphorically. Let me unpack the metaphor. Evolution needs to demonstrate how bacteria could gain the genetic information to add to their physical complexity until they become everything from wolves to cabbage. This means taking a string of DNA some hundreds of thousands of letters long, and adding BILLIONS in the right order by pure, blind, accidental chance.”

“That’s how it happens!” Carl insisted.

“I’ve got a quote on the topic which might clarify my point,” I said. Then I read the following:

> **“*To propose and argue that mutations even in tandem with ‘natural selection’ are the root-causes for 6,000,000 viable, enormously complex species, is to mock logic, deny the weight of evidence, and reject the fundamentals of mathematical probability.”***
>
> *Cohen, I.L. (1984) Darwin Was Wrong: A Study in Probabilities , New York: New Research Publications, Inc., p. 81*

“What does ***probability*** have to do with it?” asked Carl.

“Imagine,” I said, “trying to turn a single prop engine plane into a Boeing 747 while it’s in flight with small, successive modifications. Keep in mind that it needs to keep flying, or you all die. Oh, and you’re all blindfolded. And you don’t know that you’re TRYING to make a 747. Are you more likely to crash and burn, or to succeed?”

Carl had no comment.

“Are you starting to see what Creationists mean when we say life is too complex to evolve by chance? Because if not, I can keep cranking out metaphors.”

“And mutations…?” asked Carl impatiently. “Airplanes aside, we are talking about the creation of new genetic information.”
“Mutations are a corruption of the existing information,” I said. “To start with, you will never get the first gene by mutations, let alone all of the genes it takes to run an entire cell. But even when you have a perfect genome, the odds are certain that every mutation will destroy the information in the DNA, and never actually produce new information.”
“That’s ridiculous!” said Carl. “We’ve been observing mutations for decades! Mutations create new breeds of viruses and bacteria all the time in nature, and have made all kinds of variations on fruit flies through experiments in the lab!”
“Mutations cause changes to be sure,” I said, “but not the creation of new genes like the Darwinian tree of life demands. Those mutations which can be said to be beneficial - like antibiotic resistant bacteria - actually result in a *loss* of structure and function. These are like getting locked in the basement during a tornado. You haven’t gained anything. You actually lost the function which allows you to open the door and get out of the basement. But by happy chance you survive when others do not. Yet, what evolution NEEDS to have happened is a mutation which ADDS information to the genome, like a guy who figures out how to get his car to fly.”
“Imagine he writes out the blueprint for a normal car,” suggested Blue Beard, “but he spells something wrong. Maybe no one would notice, like he adds and extra ‘e’ in wheel. He gives a copy of that to a hundred other people, and they all draw their own copy, each of them unknowingly adding spelling mistakes to the blueprint, and they each give their copy to a hundred other people, and so on.”
“After a while,” I said, “there would be a lot of spelling mistakes, right?”
“And all different kinds!” Blue Beard replied.
“And eventually,” interjected Carl, “one of those has errors that add up to something new and better!”
“But how many spelling mistakes,” I replied, “do you have to make in the blueprints for a car before it can fly, and without passing through a phase where it explodes?”
“I’m just a humble doctor,” said Bill, “but I find living things don’t tend to function so well when you start making changes to their insides. There’s a lot more ways to go wrong than to go right!”
“Like flipping a coin heads up a thousand times in a row,” I said, “there’s nothing literally impossible about what Carl is suggesting, but the odds of getting a car that flies are far, far less than the odds of getting a car that stops being able to car.”
“Speaking of flying,” said Bill, holding up his personal computation device, “I have a couple of quotes about those fruit fly mutations Carl just mentioned. Scientists have been using our friends in Drosophila to research mutations for decades.”

“What’s a Drosofilliana?” asked Blue Beard. “That one of them little middle eastern countries?”

“Drosophila,” answered Bill, “is a genus of small flies, belonging to the family Drosophilidae, whose members are often called ***fruit flies***.”

Blue Beard nodded in understanding and Bill read the following:

> ***“The fruit fly has long been the favorite object of mutation experiments because of its fast gestation period (twelve days). X-rays have been used to increase the mutation rate in the fruit fly by 15,000 percent. All in all, scientists have been able to catalyze the fruit fly evolutionary process such that what has been seen to occur in Drosophila is the equivalent of many millions of years of normal mutations and evolution.”***
>
> *—*Jeremy Rifkin, Algeny (1983), p. 134.*

“There you go!” exclaimed Carl. “MILLIONS of years of normal mutations and evolution! Imagine what these experiments have produced!”

“We don’t need to imagine,” said Bill. “I have a couple of quotes about that too.”

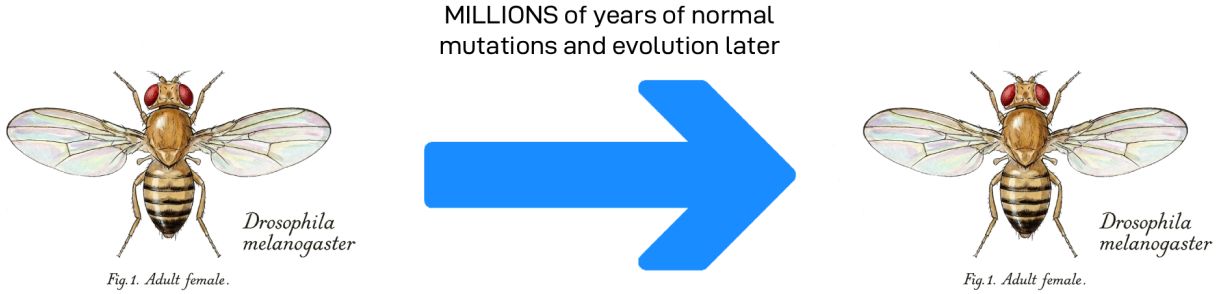
> ***“Fruit flies refuse to become anything but fruit flies under any circumstances yet devised.”***
>
> *—*Francis Hitching, The Neck of the Giraffe: Where Darwin Went Wrong (1982), p. 61.*

“Imagine!” laughed Blue Beard. “Read us another one, Bill old man!”

Bill read the following;

> ***“In all the thousands of fly-breeding experiments carried out all over the world for more than fifty years, a distinct new species has never been seen to emerge … or even a new enzyme.”***
>
> *Gordon Taylor, The Great Evolution Mystery, New York: Harper & Row, 1983, pp 34, 38*

“Seems that far from creating life in the lab,” I noted, “we can’t even get it to CHANGE in the lab.”



“Rotten little, uncooperative insects,” shouted Blue Beard, thick with sarcasm. “Don’t they know we’re trying to prove evolution here? Did anyone tell them? Whose side are they on anyway?”

“Apparently,” said Bill, “no one has told them - for millions of years! Listen to this!”

> ***"If mutation were a variation of value to the species, then the evolution of drosophila should have proceeded with extreme rapidity. Yet the facts entirely contradict the validity of this theoretical deduction; for we have seen that the Drosophila type has been known since the beginning of the Tertiary period, that is for about fifty million years, and it has not been modified in any way during that time."***
>
> *MICHEL DELSOL PROF. OF BIOLOGY, UNIV. OF LYONS, ENCYCLOPEDIA OF THE LIFE SCIENCES Volume II, p. 34.*

"Well, in that case," said Blue Beard, "then the lab tests have accurately reflected the lack of Evolution in nature. Bully for those boys in lab coats."

"Consider your coin flipping again," I said to Tom. "Remember that DNA codes for proteins, which build the cell?"

"Sure," said Tom. "I've got that."

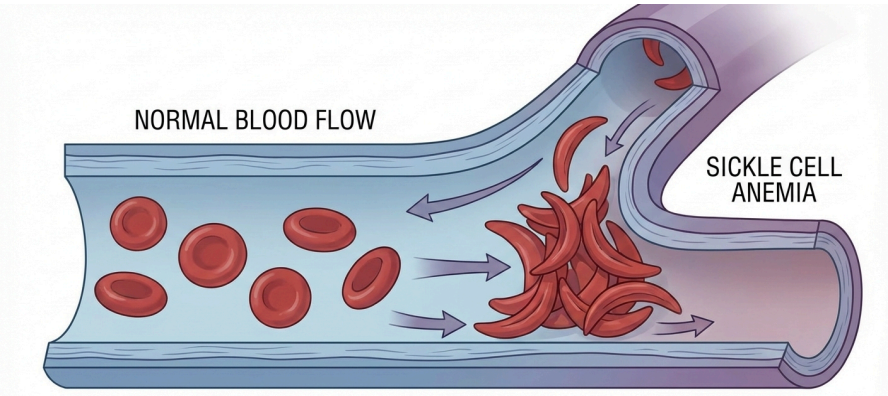
"Did I mention that an average functional protein needs **900 of those DNA letters** in the right order?"

"You did not."

"You know how having one number wrong in a telephone number means you can't make your call? It can be a lot like that. Only the wrong number kills you."

"Don't be silly," said Carl. "You talk like a single wrong letter in a gene will kill you."

"It can," said Bill. "Sickle Cell Anemia is the result of ONE wrong letter. In fact, there are more than two hundred places in the genes that make blood cells we know about where a change will cause disease and death. Your cells will pay dearly for dialing a wrong number."

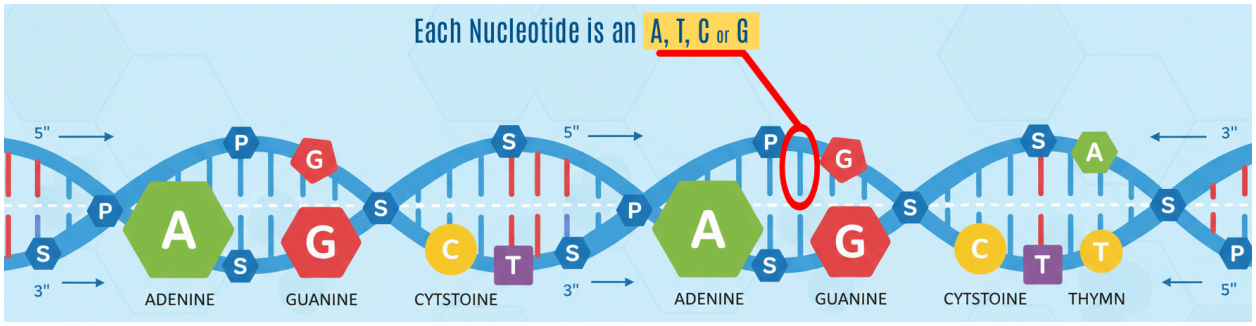


SICKLE CELL ANEMIA: Abnormal hemoglobin causes red blood cells to become rigid and sickle-shaped, obstructing blood flow and leading to pain and organ damage.

"On the bright side," said Blue Beard, "DNA gets free nights and weekends, and unlimited texting."

"That could be the cause of lots of mutations," I said. "Your cells try to text and replicate at the same time. Tragically, not all of them survive."

“Of course, sometimes the errors don’t do any harm,” said Bill.
“Thank you,” said Carl.
“First, there are machines in the cell that do spell check,” Bill explained, “finding and correcting errors before they can get passed on.”
“Boy!” exclaimed Blue Beard. “Sure is lucky that evolved through blind random chance over millions of years!”
“And second, there is built in redundancy,” said Bill. “The amino acids, you see, can be spelled more than one way in the DNA.”
“What do you mean?” asked Tom.
“Well, three of the DNA nucleotides,” explained Bill, “those little horizontal rungs up the DNA ladder in the pictures, there’s four versions of those. We call them by the first letter of the name of the chemical that makes them different - A, T, C, and G. And three of those together is the code for a particular amino acid.”



“OK,” said Tom, looking at an illustration of a DNA strand.
“Now, one of those amino acids that can get put into a chain, you see, is called Glutamine, and it gets added if the DNA strand says CAA, or if it says CAG.”
“So a mutation which changes CAA to CAG,” said Tom, “wouldn’t change the amino acid chain, and so it wouldn’t change the protein…”
“Right,” said Bill. “That’s a neutral mutation. It’s like spelling Cat Food with a K so it reads Kat Food. Everybody is still going to know what you mean.”
“So mutations might not do anything at all,” suggested Tom.
“But over generations,” Bill continued, “those harmless errors add up until they are harmful. Neutral mutations are like smoking. Your first cigarette probably won’t kill you, but over the years, the tiny bits of tar from each one accumulate until your lungs look like a freshly sealed driveway. After that, your tennis game starts to deteriorate, along with your cardiovascular system. “Harmless” mutations are a lot like that.”
“In a sense,” I added, “It’s like spelling mistakes in a recipe. There’s a lot of places where a recipe for muffins might not cause the recipe to be different. But if it happens over and over, eventually the recipe is calling for things you don’t want in your muffins, or it’s just unreadable so you can’t use it at all.”

“Are you guys really trying to tell me that you think no mutation ever helps any cell?”

“No, of course not,” said Bill. “In the medical field, we see mutations all the time which cause a cell to grow faster and more vigorously than a normal cell. Those cells seem impossible to kill sometimes.”

“There you go,” said Carl. “Beneficial mutations causing cells to grow and survive better than normal cells.”

“Carl,” said Bill, “do you know what cells I’m talking about?”

“Sure. Those *superbugs*. Antibiotic resistant bacteria. Right?”

“No, Carl. I’m talking about cancer.”

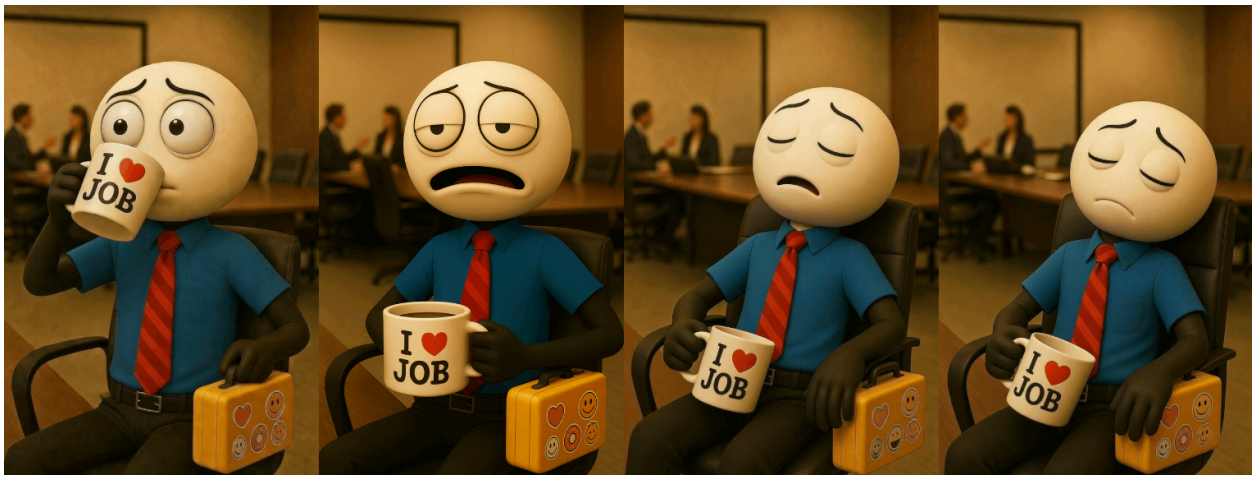
Carl had nothing pithy to say about this latest scientific revelation, so I put in my two cents. “In summary, mutations making new genetic information is hypothetically possible, just as it’s hypothetically possible to get George Washington’s face on a mountain with erosion, or hypothetically possible to flip a coin so it lands heads up a thousand times in a row.”

“Although, to be fair,” added Blue Beard, “we need to realize that every species on earth needs to flip a coin heads up a thousand times. Remembering too that coming up tails kills you.”

“And observations in this area,” added Bill, “have shown bacteria and fruit flies experiencing millions of generations of mutations, but never producing any new beneficial feature of any kind. In fact, the only beneficial mutations ever seen have been losses of genetic information, which, as has been said, is the opposite of what is needed to grow the Darwinian Tree of life.”

“And it seems to me,” said Tom, “that for every one of these genes, there are a huge number of ways a mutation can go wrong.”
“Come on, Tom!” objected Carl. “Whose side are you on? Are you joining the religious wackos against science now?”
“I’m not against science, but I have to consider the math. If the average protein takes nine hundred DNA letters written in the right order,” said Tom, “that means you have a lot of information which has to be right in order to get even one functional protein.” He held out his own personal electronic device to Carl. “If you think it's easy getting a particular sequence through blind, accidental chance, then here, see if you can guess my four digit pass code.”
“Then do it for nine hundred phones,” suggested Blue Beard. “If you can do that, I think we’ll all admit that getting a protein by accident is easy.”
“Sorry Carl,” said Tom. “The numbers don’t lie. Lots of things are *possible* which are simply *improbable to the point of* ***impossible***.”
“When people say evolution is impossible,” I explained, “it's not because they don’t know how it could work, it’s because they know enough to know ***it could not work.*** Many evolutionists stick to evolution to fill in the gaps where a step up is impossible. *“It must have evolved,”* they argue, *“Because there it is.”* This is a very common ***“Evolution of the gaps”*** attitude.”
Whatever retort was formulating in Carl’s mind, it was quelled by the arrival of the great feat of Nacho for which we had waited. Tom’s mind was buzzing with numbers, and I hoped he would share what he deduced. In the meantime, there was Nacho to be had, and darts to be thrown, and a lot to be said about the most recent theories surrounding the latest science fiction blockbuster movies. Our discussion of science would have to continue another time.

Defining Evolution 15: More on Mutations



The days had flown by like five minutes under water, and we once again dragged our weary bodies into Danny's Bar, Grill, and House of Rabblerousing for the plate of Nachos which is so big it has to be factored into calculations when attempting to put satellites into orbit. Between the first quarter analysis projection spreadsheets and the resulting meetings, round table discussions, and memorandums, I thought my brain could do no more for the week, but the friends around the round table near the dartboard would spur my tired grey matter into further activity.

Carl, Bill, Tom, and Blue Beard were all nursing root beers when I arrived, and I could tell by the looks on their faces when I walked in that there would be no time wasted on pleasantries.

"There's our gentleman and scholar," remarked Blue Beard.

"What ho fellows," I grunted wearily. "You all seem a bit bright eyed for a day which seems to have lasted, by my calculations, a bit longer than the Roman Empire did."

"We're talking science," said Tom.

"Without me?" I replied. "I hope you saved some fun for yours truly."

"We're talking about mutations again," said Tom. "Very simply, I realized that I need more information if I'm going to discount mutations as improbable."

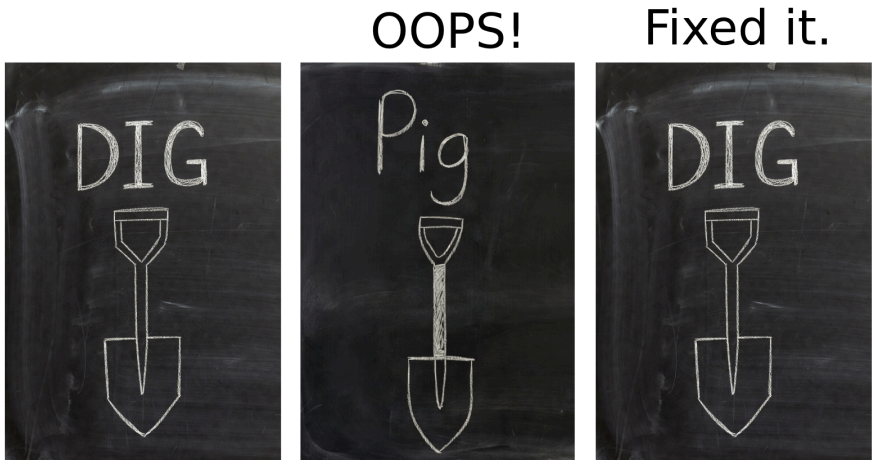
"I've done some homework myself," said Carl. "I've got an article here by New Scientist that explains how many mutations we've observed which do create new genetic information. Listen to this;

> ***"Most mutations can be reversed by subsequent mutations – a DNA base can be turned from an A to a G and then back to an A again, for instance. In fact, reverse mutation or "reversion" is common. For any mutation that results in a loss of information, logically, the reverse mutation must result***

in its gain. So the claim that mutations destroy information but cannot create it not only defies the evidence, it also defies logic.
newscientist.com/article/dn13673-evolution-myths-mutations-can-only-destroy-information/

“Can I at least get a root beer?” I asked.
“Right behind you, sweetie,” said Wendy, handing me a tall frosty mug of compassion. She calls everyone “sweetie,” but like I always say, that the sun shines on everyone doesn’t make it feel any less warm.
“Thank you, Wendy,” I said to her. “Now, Carl, let's go over this quote again. The point is that mutations can be reversed?”
“That’s right.”

“So the cell ***corrects the mutation***, causing the net result to be… **nothing**?”

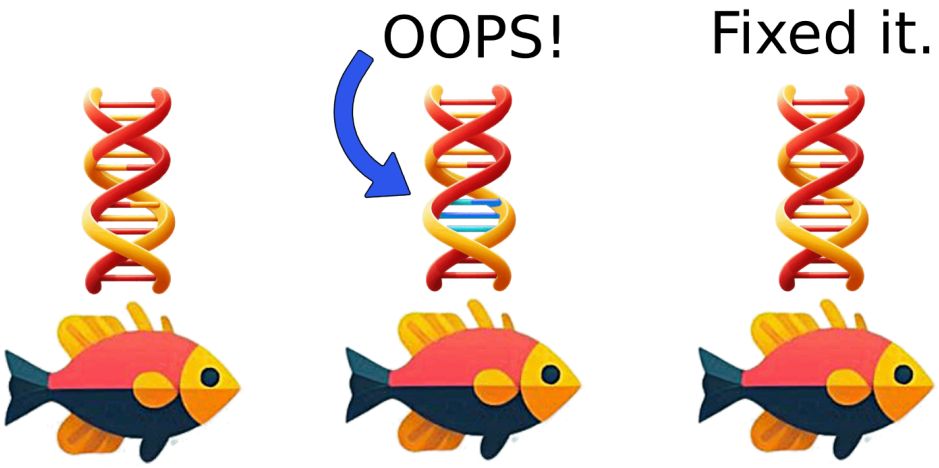


“It’s called a reversion,” said Carl. “The cell adds back the missing information, and as the article said, it logically must result in the addition of the information which was lost.”
“Carl, that’s called spell check. It’s correcting its own mistakes so that they are repaired and ***no changes are actually made***, long term.”
“But I think the point is well made,” said Carl, “when they say,

> ***“For any mutation that results in a loss of information, logically, the reverse mutation must result in its gain.”***

“Carl, when you read idiots who don’t understand logic it only makes us all dumber.”
“Name calling won’t change the facts, Rent old boy.”

“Fair enough,” I said. “Forgive me. It’s been a super long day. But this article seems to have been written by a twit. He’s essentially said that an error, when corrected, is a net ***gain in new genetic information***. And that’s stupid.”
“Why?” demanded Carl.
“Come on Carl!” exclaimed Blue Beard. “When NOTHING new is gained, then nothing new is gained! The semantic trick this twit is playing is saying that the repair of a mutation is itself also a mutation, calling a repair ***an addition*** of information, then claiming that it disproves the idea that mutations only destroy information. All that leaves you with is the fact that mutations, UNLESS REPAIRED by the cell’s complex and information saturated editing system, have only been seen to destroy existing information.”
“Besides that,” added Bill, “I don’t think the point was ever that no change could ever fix existing information. The point against evolution is that no mutation has ever been seen to create new genetic information.”
“Seriously Carl,” I said, “you need to read this garbage before you throw it at me in this victorious manner. You find some twit who’s anxious to say creationists are illogical and you fail to catch a very obvious flaw in his logic.”
“What flaw?” demanded Carl. “He’s shown that mutations - changes in the DNA - can be seen to increase the genetic information! That proves YOU were wrong for saying mutations never create new genetic information!”
“Carl, will a new gene for a new feature ever be made by a system repairing a change so that there is **no net change**?”
“No, but that’s not the point…”
“What’s the point?”
“Well… any change in information is new information…”
“No, Carl, it’s not. Look, it’s been a long day and I’m not meaning to be rude, but I don’t have the energy to deal with stupid.
“Picture two genetically identical fish. One fish gets a mutation,” I said, “ and then its cells correct that mutation. Is it closer to becoming a lizard than the other fish?”
“No, but…” Carl floundered.
“What if this happens a billion times? Now is the fish more genetically close to being a lizard? Or is it still genetically identical to the other fish just like it was when we started?”
“Well, it’s… I mean, there was a mutation…”



“A misspelling is not a new word, it’s the loss of a word. Correcting a misspelling is also not a new word. A broken machine is not a new machine, and repairing a broken machine is not the invention of a new one. A corrupted gene is not new information. Get a clue. Tom, what was your question?” I already knew what the look on Carl’s face would be, so I didn’t bother to look.

“Rent-A-Friend is feisty today,” mused Blue Beard.

“Sorry,” I said, drinking deeply my root beer. “Long day. Tom?”

“Well, I got the idea last week that mutations are so improbable that they should be considered impossible,” recalled Tom, “but what are the numbers that back that up? It seems that, even an improbable event can happen, and given enough time and enough chances the improbable can become possible.”

“Fair enough,” I said. “Bill, what can you tell us about proteins?”

“According to the National Center for Biotechnology Information,

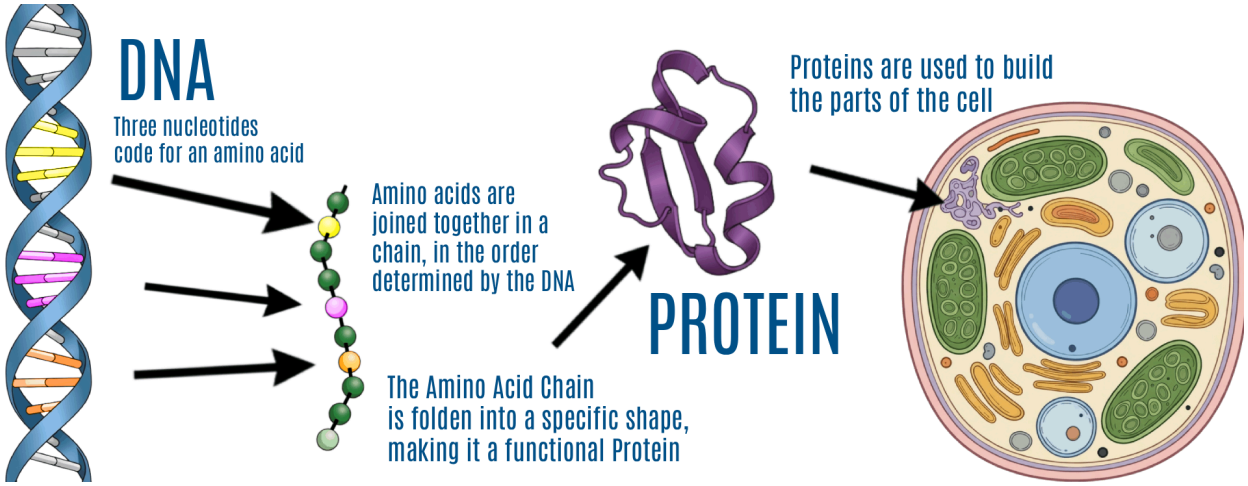
> ***“Proteins come in a wide variety of shapes, and they are generally between 50 and 2000 amino acids long.”***
>
> *http://www.ncbi.nlm.nih.gov/books/NBK26830/*

“And what are proteins again?” asked Tom.

“Sorry, Tom,” said Bill. “Proteins are the kind of molecules which cells are made of. If a cell is a car, then an amino acid chain is a sheet of metal, and a protein is a sheet of metal which has been bent into the shape of a muffler, or a piston, or anything else in the car pretty much.”

“So, cells are made of proteins?” asked Tom.

“In short,” said Bill, “yes. In long - cells are made of organelles, which are made of membranes and machines, much of which is made of proteins. DNA codes for amino acids, which are linked together in the order coded for in the DNA, and then the chain of amino acids is folded like origami into a protein and put wherever it needs to be used by the cell.”



“I think I get it,” said Tom. “So the DNA codes for amino acids, which are folded into proteins, which are assembled to make organelles, which together make a cell?”

“That’s the whole truth, Jack!” exclaimed Bill, slapping the table.

“And the reason mutations matter,” said Tom, “is because they can change what amino acid goes in the chain, and thus what protein gets made as a result.”

“Which changes the cell,” said Bill, “which might change the tissue and thus organ it’s part of in the organism.”

“This junk gets complex,” said Blue Beard honestly.

“Well, hold onto your shorts,” said Bill. “Because we’re gonna add some math. I’ve got some different numbers from different sources, but all basically the same. First, here’s the range we’re talking about:

> ***“An average eukaryotic protein contains around 500 amino acids but some are much smaller… and some much larger (the largest to date is titin a protein found in skeletal and cardiac muscle; one version contains 34,350 amino acids in a single chain!).”***
>
> *http://users.rcn.com/jkimball.ma.ultranet/BiologyPages/P/Proteins.html*

“34,350 amino acids!” exclaimed Tom. “How much DNA does it take to code for that protein?”

“3 ‘letters’ in DNA codes for one amino acid,” said Bill.

“Which means it takes 103,050 DNA letters to code for that one protein!” said Tom, sincerely impressed.

I was also sincerely impressed by how fast Tom did that calculation in his head.

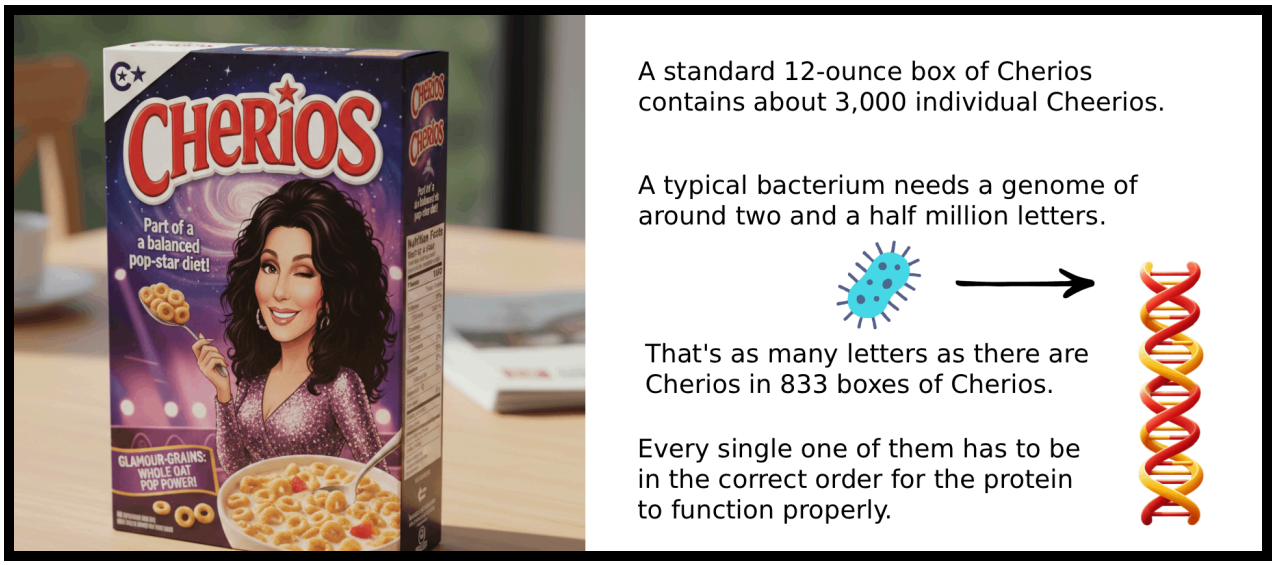
“And Carl wants us to think that all 103,050 of those letters,” explained Blue Beard, “came to be in that order by a spell checker correcting mistakes.”

“That’s not…” began Carl, but he stopped either because he knew how futile it would be to argue with Blue Beard, or because he knew Blue Beard had accurately explained his most recent folly.

“According to the web site www.learner.org,” said Bill,

"the average protein has 200-300 amino acids. A typical bacterium requires more than 4,000 proteins for growth and reproduction."

"Which means," said Tom effortlessly, "a typical bacterium needs a genome of around two and a half million letters."



"A 12pt, single spaced page," I added, "has approximately 3,000 characters, which means letters and spaces. So this typical bacterium genome, if typed out, would require how many pages?"

Tom blinked a few times and said, "More than 800. Something like 833 pages."

"Pages created by correcting misspellings," said Blue Beard, determined not to let it lie. Carl rolled his eyes and refused to respond.

"The smallest collection of DNA for any organism we know of," said Bill, always a wealth of information, "belongs to **Carsonella ruddii**. Carsonella ruddii only has 182 genes, written in 160,000 base pairs - which means 160,000 DNA letters."

"Printed out, it would fill about 50 pages," said Tom.

"That's how many pages are in Green Eggs and Ham," I said.

Hey, I know stuff too.

"And I'd like to remind us," said Blue Beard, "that the fifty pages of information it takes to make that one, very simplest cell, somehow wrote itself and then built a cell to live in. Right Carl? I mean, I think we can all agree that Green Eggs and Ham could have written itself, with no Dr Seuss. Why not the same number of pages, 3,000 letters of organized information per page, and all of which codes for the making and running of self-replicating machinery?"

"Just because you don't know how it happened…" began Carl.

"Fifty pages!" interrupted Blue Beard. "But what READS those fifty pages? Well, there's machines in the cell what reads it, ain't there? But where does they come from? Well, thems coded for in the DNA, ain't they! Machines read the DNA to make the proteins

that's used to build the machines what reads the DNA! So without DNA, you can't build the machines, but without the machines, nothing reads the DNA to build what it codes for, but if nothing builds what it codes for, then, there's nothing to read the DNA and build anything even if FIFTY PAGES OF INFORMATION MANAGED TO WRITE ITSELF."

This last part was directed toward Carl, who, true to form, refused to respond.

"But back to Tom's math question," said Bill. "Dr. Carl Werner, in his book "Evolution the Grand Experiment" makes it easier by assuming much smaller numbers:

Let's say an average Protein needs 300 amino acids.

We know it takes 3 Nucleotides to code for one Amino Acid.

Let's say there are 20 proteins needed for the first cell.

Thus: 3 Nucleotides x 300 Amino Acids x 20 Proteins = 18,000 DNA Letters.

Tom blinked thoughtfully for a moment. "That's around 11% of the DNA you said was in the smallest genome we know of. So we're assuming today's simplest cell has ten times as much genetic information as this hypothetical first cell."

"That's right," said Bill. "Dr. Werner decided to stack the deck in favor of that first cell. Now, here's a few numbers to keep in mind before continuing. Tom, write these down. First: Your odds of ever being hit by lightning is 1 in 10,000 *(Or, 1 in 10 to the 4th)*. The odds of winning the national Powerball Lottery EVERY DAY FOR A YEAR is 1 in 10 to the power of 2,881."

"Hold on now," said Blue Beard. "What's this power of?"

"The power of," said Tom, "means how many zeros you would write behind it, or how many times you multiply ten by ten. So, a hundred is ten times ten, or 1 with two zeros, so it's ten to the 2nd power. 1,000,000 is ten to the power of six, and is a one with six zeros after it."

"So the odds of winning the lottery every day for a year," said Blue Beard, "would be one chance in… ten to the power of 2,881. So, it would take 2,881 zeroes to write out that number?"

"That's right, Jack."

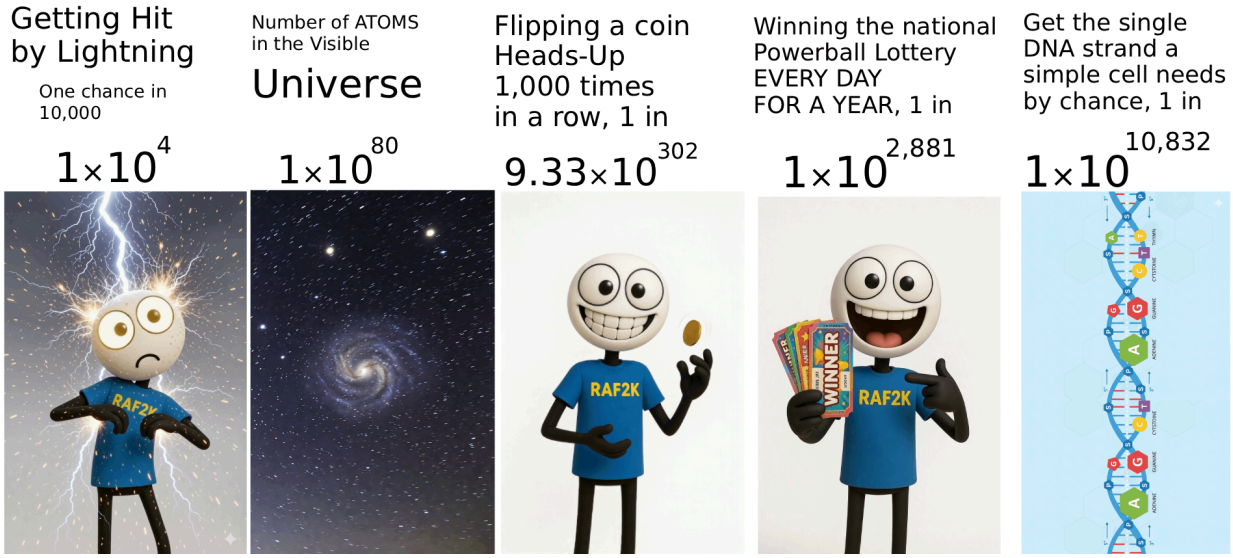
"Hows about I get an example to help me visualize this big number business?" asked the Captain.

"I've got one," I volunteered. "Picture a football field. How many blueberries would it take to cover an ENTIRE football field?"

“Normal ones?” he asked. “Little guys what we put in a muffin?”
“Yes. Normal blueberries.”
“I don’t know,” Blue Beard admitted. “A million?”
I shook my head. “30 million blueberries.”
“That so?”
“And **30 million** in scientific notation… that’s what we call it when we put it in terms of how many zeroes are at the end of the very big number… **30 million** would be **3 x10 to the power of 7**. 30 million is a 3 with seven zeros after it.”
“And when we’re talking about statistical odds,” added Tom, “imagine I put a diamond inside one of those blueberries, and you have ONE CHANCE to walk the football field and choose that berry from the 30 million covering the field. That’s 1 chance in 3x10 to the power of 7. One chance in 30 million.”
“Not great odds,” admitted Blue Beard.
“Now, would you like to guess at how big of a number you get when you count how many blueberries it takes to cover a football field to a depth…” I paused for dramatic effect…”of TEN MILES!”
“Good mercy!” said the Captain. “You’ve got blueberries floating out to the edge of space! Must be… like a thousand times or more…uh… 3 x 10 to the power of… 7000?”
“This is where exponential growth gets counterintuitive,” said Tom.
“Going from 3x10 to the power of 7,” I explained, “up to 3x10 to the power of 8 goes from 30 million to 300 million. So about six inches deep. But increasing the power from 8 to 9 makes it about 4 and a half feet deep. Increasing again to the power of 10 makes it 45 feet deep. Every time that power goes up one, we’re multiplying by ten.”

“That adds up fast!” said Blue Beard.
To get to the top of the atmosphere only requires 3x10 to the power of 13 blueberries.”
“Boy!” our pirate friend said, “If I had a nickel for every blueberry you just stacked…! Well, I’d have nowhere to put them.”
“Oh, that reminds me,” I said, digging through my bag of tricks. “Last week we had talked about flipping a coin so that it landed heads up a thousand times in a row. Remember?”
“That’s right,” said Tom. “We said it was possible but highly improbable.”

“Would you like to know HOW improbable?” I asked.
“Certainly.”
“The odds would be one chance in 9.33×10 to the power of 302.”
“So easier than winning the lottery every day for a year?” asked Blue Beard.
“Decidedly so,” answered Tom.
“Now, to give all of you some sense of scale,” said Bill. “The Number of Atoms in the visible Universe*- the whole UNIVERSE, you understand?- is 10 to the power of 80.”
“That’s it?” asked Blue Beard. “You sure it isn’t eighty thousand or something?”
“Very sure,” said Bill. “Of course, that’s only an estimate. I always lose count around ten to the power of 65 atoms. Anyways, this brings us back to the beginning. Let’s say an average Protein needs 300 amino acids. We know it takes 3 Nucleotides to code for one Amino Acid. Let’s say there are 20 proteins needed for the first cell.
Thus: 3 Nucleotides x 300 Amino Acids x 20 Proteins = 18,000 DNA Letters.”
“Right,” said Tom. “I’ve got that.”
“To get all 18,000 nucleotides in the right order by chance is **1 in 10 to the power of 10,832**. You are more likely to get hit by lighting ***700 times*** than you are to win the lottery every day for a year, *BUT*,” he blurted out for emphasis, “you are **almost four times more likely** to win the lottery EVERY DAY FOR A YEAR than to get the single DNA strand a simple cell needs by chance.”



“Yet Carl,” said Blue Beard, “and some very popular as-seen-on-TV scientists, still believe that this DID happen. Oh, and then somehow it built its own cell to live in.”
“So when Carl tries to paint this conversation as science vs blind faith,” I added, “do you see why I insist that I am on the side of science?”
Carl grunted and looked away, with apparently nothing to say. Tom, on the other hand, was starting to get the picture.

“The first cell does seem staggeringly unlikely,” he said. “But how does all of this tie into mutations after we have cells alive and reproducing?”

“A very good question,” I said. “Let me give you some literary background to explain it. **One page of text holds about 3000 characters**.

The Human Genome (*The complete list of our DNA*) is made up of **Three Billion base pairs** - those DNA letters arranged in **46 chromosomes**. Thus there are about 65,000,000 base pairs per chromosome. How many pages is that?”

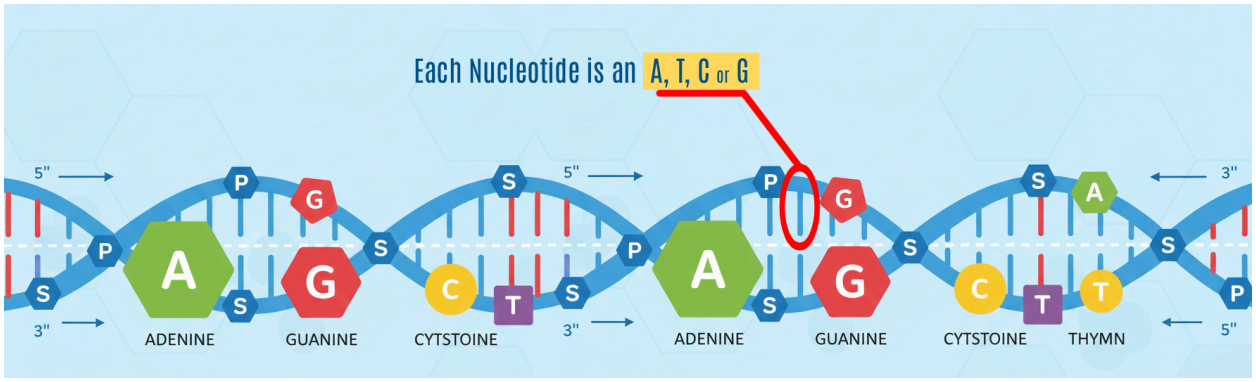
“65 million Base pairs per chromosome divided by 3000 characters per page = 21,666 pages of text per chromosome,” replied Tom.

“There are about 4,000 pages of text in the seven book Harry Potter Series. Thus **one human chromosome** is as much information as about ***5 ½ copies of the entire Harry Potter series***.”

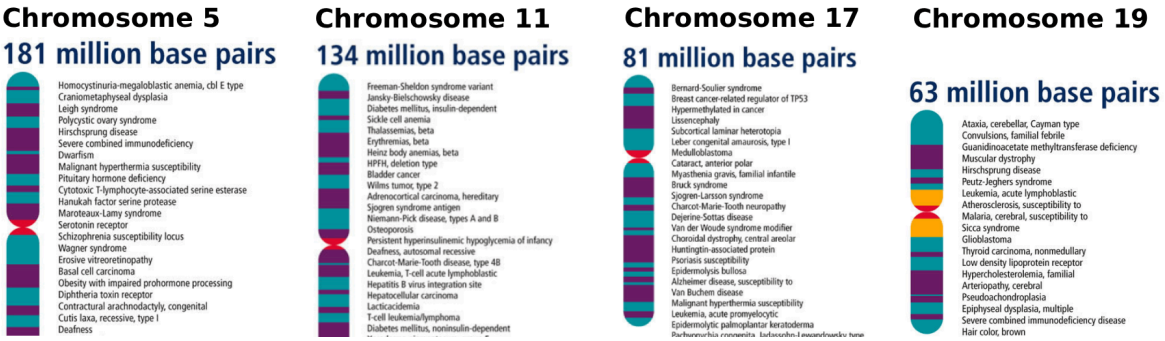
“That’s a lot of information,” Tom observed.

“And the human genome,” I continued, “all of the DNA we have in every single one of our cells, would be equal to about **250 copies of the entire Harry Potter Series**. That’s 250 copies of the whole seven book series, which took eight movies to translate to DVD. To watch 250 copies of all eight movies would take more than…” I hesitated because I was an art major.

“More than a hundred and sixty days,” said Tom. “Almost five and a half months.”



“Now check out **this list of Chromosomes and potential diseases** ** which comes from a corruption of that information,” said Bill, holding up his personal computation device. “There are genetic problems from irritating to deadly which can come about because of as little as ONE WRONG LETTER. Life threatening conditions like Sickle Cell Anemia can result from a single LETTER being wrong in this vast collection of information.”



“Imagine,” I said, “that you had to make 250 copies of the entire Harry Potter series, but if you got one letter wrong, you might die. The reason I am bringing this up is because misspellings - aka: Mutations - are the ONLY mechanism evolution has of making new genetic information so that bacteria can eventually become cabbages and wolves.

“Imagine I have given you **one copy of Green Eggs and Ham** (*But written accidentally with no Dr Seuss*) and I want you to change it into **250 copies of the Harry Potter series** through random, blind, accidental misspellings. Some random misspellings won’t do anything, but, just as an example, let’s assume that if you misspell anyone’s name, you die. But take all the time you need. Blindfolded.”

“I think I have a real world example of how delicate all of that DNA is,” said Bill. “Here’s a little something from *Genetics Home Reference (ghr.nlm.nih.gov/gene/HBB)*”

> ***Nearly 400 mutations in the HBB gene have been found to cause beta thalassemia. Most of the mutations involve a change in a single DNA building block (nucleotide) within or near the HBB gene.***

“In short,” explained Bill, “there are almost 400 places where changing as few as one nucleotide can distort or destroy red blood cells.”

“Yet, this is the blind, random, accidental process,” I reminded us, “which is alleged to create these genes in the first place. What are the odds that this will ever result in new and better genes?”
“It’s..” stuttered Tom. “Well, it’s like trying to flip a coin heads up a thousand times.”
“This is the evolutionary story,” I reminded him. “If this DID happen, then this is proof that God was working regular miracles the entire time, because there is no WAY this was going to happen by chance. I don’t care if you do have four billion years. You could have eight billion years and a team of PhD’s working around the clock and you aren’t going to live to find out what a “Muggle” is.”
“A whats?” asked Blue Beard.
“It’s a word from the Harry Potter books,” I explained.
Blue Beard grunted his disinterest and went back to his root beer.
“But there’s been billions of years of evolution!” objected Carl. “Unlikely things, given enough time, become certain to occur!”
“That’s not how probabilities work,” said Tom. “Every lottery ticket has the same odds. If it’s one in a million, you aren’t guaranteed a win if you play a million times. Your odds against winning are a million to one *every time you play*. Every time is like the first, and the odds don’t get better just because you have more opportunities.The only way to ensure you win the lottery is to be able to play every possible number combination at the same time.”
“Maybe that’s how evolution works!” said Carl, determined to find a silver lining to the cloud of mathematics over his head. Bacteria reproduce really fast. Maybe they could try enough winning numbers at the same time.”
“Even if you’re right about there being billions of years of evolution,” said Tom, “there’s still not enough time for billions of bacteria to accidentally create a protein. The odds are just too high. There are more possible combinations for one bacteria’s worth of DNA than there are atoms in the universe!”
“Like we’ve said,” I continued, “making new information through mutations is not technically impossible, just as flipping a coin heads up a thousand times in a row is not impossible. But both are so unlikely that we can safely declare that they will never happen. Furthermore, the study of genetics has shown us how fine tuned the DNA information is. Every gene we’ve studied shows the potential for harmful and deadly mutations, but none have shown the ability to be improved by blind chance. Some genetic disorders are caused by as little as one spelling mistake among thousands or even millions of DNA letters. Mutations are a hypothetical, but will never be an actual mechanism of evolutionary change. All things considered, it would take a lot more faith than I have to believe that EVERY living thing on earth came about by blind, accidental mutations.”

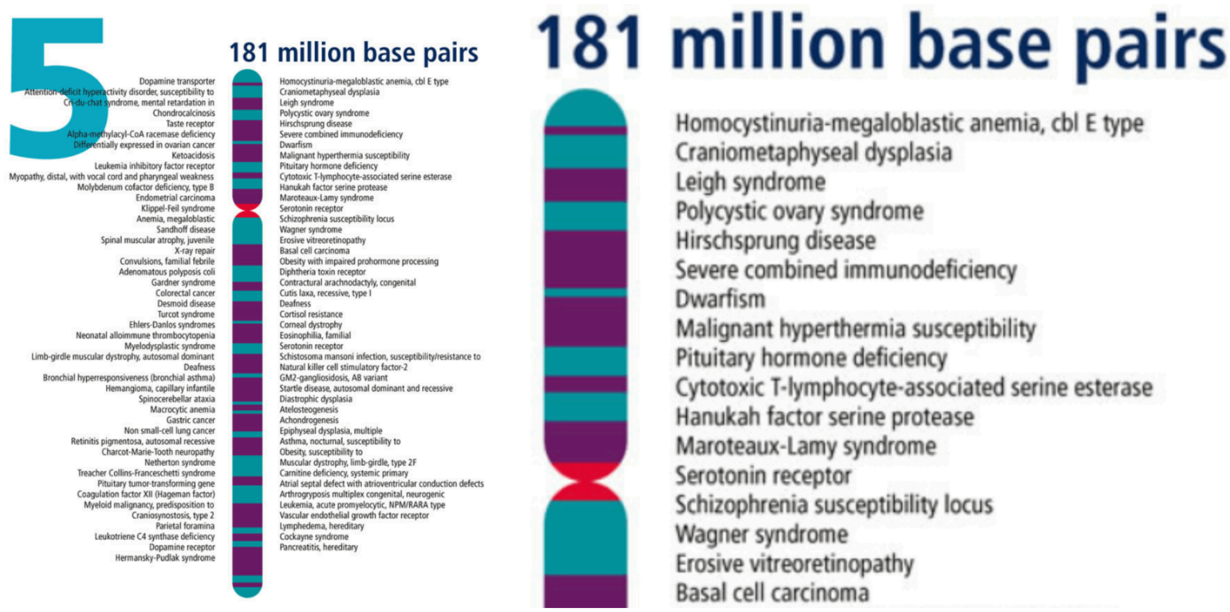
As if on cue, our friend and waitress, Wendy, came out with our Nachos just as I finished waxing eloquent. Quickly we dug into the pile of chicken and cheese and jalapeños and olives and… well, you get the idea. Nachorama!

My brain, completely spent, I was happy to let my thoughts fade into the sound of nachos being consumed by good friends on a Thursday night.

**http://www.universetoday.com/36302/atoms-in-the-universe/*
Dr. Carl Werner, Evolution the Grand Experiment, 2007

*** https://doe-humangenomeproject.ornl.gov/chromosome-viewer/*

Human Chromosome 5



Here's just one chromosome to give an example of how badly mutations affect existing genes.

The odds of Flipping a coin heads up a thousand times in a row is
1 in 9.33264 x10 to the power of 302.
Or,
1 chance in

9332640000000000000000000000000000000000000000000000000000000000000000
0000000000000000000000000000000000000000000000000000000000000000000000
0000000000000000000000000000000000000000000000000000000000000000000000
0000000000000000000000000000000000000000000000000000000000000000000000
00000000000000000000000.

In case you wanted to see what that number looked like.

Defining Evolution 16: Fossils

Somewhere on the horizon, like a beacon of hope in a storm of copies in triplicate filed with accounts receivable and marketing and meetings about the GNP sway toward diversified demographics whose profiles are identical to previous markets save the range of diverse terminology mandated for categories of markets calculations *(After this long, long Thursday, even I didn't know what most of that meant. It was like drinking from a fire hose)...* after all of that was a huge pile of Nachos. On that horizon- known by locals as Danny's, and labeled by the signage above as *Danny's Bar, Grill, and House of Rabblerousing*- sat an island of Nachos, gleaming like the setting sun only with far more jalapeños, which was our weekly escape from the storm. A port, surrounded by inlets of root beer.

When I arrived at Danny's, I didn't really think that the conversation about evolution would continue this night. I'd already come up with a wonderfully clear and tremendously helpful definition for Darwinian Evolution *(The world's first!)*. We had hashed out the details, debating why the definition said what it did, and then we examined a host of mechanisms of Darwinian Evolution to see that, when Evolution was understood more clearly than "Changes happening" it was obvious that it did not happen. Changes happen all of the time, but not one of them will grow that Darwinian Tree of Life, and thus there is no reason to think Evolution even COULD happen, let alone that it had been going on for billions of years, doing the work of a genetics bioengineer.

However, when I sat down and began to give attention to my root beer, the specter of Darwin arose to haunt our Thursday night once again.

"So I've been thinking," said Captain Blue Beard, "we've sailed down the yellow brick road of Chuck D and seen that Evolution is less tangible than a Kraken in a Pilates

class. Yet, I don't think any of us has heard Carl change his mind about Evolution being a fact of science supported by a mountain of evidence, have we lads?"
"It IS supported by a mountain of evidence," said Carl gruffly. "You religious fanatics simply don't understand it."
"Oh, sure," said Blue Beard with a smirk, "I think that's been made clear these past few weeks, eh?"
"I'm pretty sure we've swept away your mountain," I said. "What's still left Carl?"
"You may not understand the mechanisms of Darwinian Evolution," said Carl in a classic fact-ignoring blanket statement, "but the fossil record shows clear evidence that Evolution has been happening for billions of years. If you knew anything about paleontology, you'd know that the fossils show gradual changes from one kind to another for billions of years."


"Can it be?" said Blue Beard with mock concern. "Has science finally raised the SS Darwin from the depths to haunt our shores once more?"
"Now, how do these fossils," Bill asked, "that you talked about, show evolution happening?
"How do you not know this?" asked Carl incredulously.
"I'm just a humble medical doctor," said Bill. "We don't dig into rocks all that often. I'm far more likely to dig into your chest cavity."
"Well, it's simple," said Carl. "The oldest rock layers at the bottom contain only simple things, like bacteria, and then above them come worms, and above that fishes, and above that lizards. The fossils show the exact kind of evolutionary progression which Darwin expected."
"It's too bad he didn't live to see that become a reality," I said.
"What do you mean?" asked Carl.

“I mean that Darwin knew the fossil record didn’t support his theory. Wait, let me find it.” I pulled out my personal electronic device and flipped through some recent bookmarks until I found Chuck D. I read the following to my friends;

> ***“Why then is not every geological formation and every stratum full of such intermediate links? Geology assuredly does not reveal any such finely graduated organic chain; and this, perhaps, is the most obvious and gravest objection which can be urged against my theory. The explanation lies, as I believe, in the extreme imperfection of the geological record.”***
>
> *Charles Darwin (1859), The Origin of Species, p. 280.*

“I didn’t know Darwin said that,” said Tom. “I always thought Darwin built his theory in part on what was found in the fossils.”

“No such luck,” I said. “He expected there to be billions of transitional forms in the rocks, and there were none.”

“That was the mid 1800’s!” Carl reminded us. “Darwin even tells you the explanation in that quote. The fossil record was largely unknown at the time. The fossil record has long since vindicated Darwin’s theory! Transitions and evolutionary gradualism are found in every layer of rock!”

“You’re a man of great faith,” I replied, “but sadly not of great information. Here’s a quote from famed Evolution true believer Stephen J Gould more than a hundred years after Darwin;

> ***“The main problem with such phyletic gradualism is that the fossil record provides so little evidence for it. Very rarely can we trace the gradual transformation of one entire species into another through a finely graded sequence of intermediary forms.”***
>
> *(Gould, S.J. Luria, S.E. & Singer, S., A View of Life, 1981, p. 641)*

“Anyone can quote-mine one quack who doesn’t know about fossils,” said Carl. “But paleontologists have told us for decades how Darwinian the fossil record is.”

“Let me see if I can find a quote from someone who works with fossils,” I said, scrolling again through my research. “How about a ***Prof. of Geology, University of Chicago, also a*** Dean of Science at the *Field Museum* of Natural History in *Chicago*?”

I read the following.

> **“A large number of well-trained scientists outside of evolutionary biology and paleontology have unfortunately gotten the idea that the fossil record is far more Darwinian than it is. This probably comes from the oversimplification inevitable in secondary sources: low-level textbooks, semi-popular articles, and so on. Also, there is probably some wishful thinking involved. In the years after Darwin, his advocates hoped to find predictable progressions. In general, these have not been found. Yet the**

optimism has died hard, and some pure fantasy has crept into textbooks."
DAVID M. RAUP, New Scientist, Vol. 90, p.832, 1981

"You're obviously just taking him out of context!" Carl insisted. "No one in the field, no REAL scientists, would ever say that about the fossil record."

"Oh no?" I asked. "Well, let's see what else he said, to see if maybe it changes his tune. Here he is saying something completely different:"

> ***"There were several problems, but the principle one was that the geologic record did not then and still does not yield a finely graduated chain of slow and progressive evolution. In other words, there are not enough intermediates. There are very few cases where one can find a gradual transition from one species to another. . .*** *(p. 23)*

"That's no good," I conceded. "Wait, here's an evolutionary website which provides more of his quotes and context in an effort to explain why people like me are morons."

> ***"Well, we are now about 120 years after Darwin and the knowledge of the fossil record has been greatly expanded. We now have a quarter of a million fossil species but the situation hasn't changed much. The record of evolution is still surprisingly jerky and, ironically, we have even fewer examples of evolutionary transitions than we had in Darwin's time. By this I mean that some of the classic cases of darwinian change in the fossil record, such as the evolution of the horse in North America, have had to be discarded or modified as a result of more detailed information — what appeared to be a nice simple progression when relatively few data were available now appear to be much more complex and much less gradualistic. So Darwin's problem has not been alleviated in the last 120 years and we still have a record which*** **does** ***show change but one that can hardly be looked upon as the most reasonable consequence of natural selection."***
>
> *(p. 25, "Conflicts between Darwin and Paleontology",* Field Museum of Natural History Bulletin *Jan. 1979, Vol. 50 No. 1 p. 22-29)*

"Obviously he's some Creationist nut who somehow made it into the Field Museum," said Carl. "Anyone can find Darwin deniers who say similar things, but that doesn't make them true."

"Obviously a Creationist Darwin Denier, eh?" I said. "Then perhaps you'll be able to explain why he said this:

> ***Darwin's theory of natural selection has always been closely linked to evidence from fossils, and probably most people assume that fossils provide a very important part of the general argument that is made in favor of Darwinian interpretations of the history of life. Unfortunately, this is not strictly true. We must distinguish between the*** **fact** ***of evolution — defined***

> ***as change in organisms over time — and the* explanation *of this change. Darwin's contribution, through his theory of natural selection, was to suggest* how *the evolutionary change took place. The evidence we find in the geologic record is not nearly as compatible with darwinian natural selection as we would like it to be.*** *(p. 22)**

"As one such Darwin denier," I said, "we don't tend to refer to the ***"fact" of evolution*** in this manner. We tend to use words like, "Myth," "Religion," or "Stupid."

"Here's my favorite," said Bill holding up his own personal computation device.

"Oh, not you too," said Carl.

"Sorry," said Bill. "But even a humble suburban doctor likes to see what other experts in their field have to say."

> ***"Paleontologists have paid an enormous price for Darwin's argument. We fancy ourselves as the only true students of life's history, yet to preserve our favored account of evolution by natural selection we view our data as so bad that we almost never see the very process we profess to study. …The history of most fossil species includes two features particularly inconsistent with gradualism:***
>
> ***1. Stasis. Most species exhibit no directional change during their tenure on earth. They appear in the fossil record looking much the same as when they disappear; morphological change is usually limited and directionless.***
>
> ***2. Sudden appearance. In any local area, a species does not arise gradually by the steady transformation of its ancestors; it appears all at once and 'fully formed.'"***
>
> *(Gould, Stephen J. The Panda's Thumb, 1980, p. 181-182)*

"Now, if I recall correctly," said Bill, "the things we all agreed had to be true of evolution according to those trees of life, you remember? Then we said evolution needed to be about living things changing over time, whereas Stephen, here, has said the fossils show stasis, meaning things NOT changing for long periods of time, and sudden appearance, which also isn't changing over time."

"Sounds like special creation to me," I said. "Animal and plant kinds coming into being suddenly and staying the same for long periods of time? Blue Beard, didn't you say both of these were features of Biblical Creation?"

"That's right. These fossils doesn't sound very Darwinian," said Blue Beard, with no tone of surprise at all. "Are you sure you're wise to consider the fossil record to be evidence FOR Evolution?"

"Of course!" said Carl. "Everyone knows that the fossil record has shown evolution. Modern NeoDarwinian evolution is built on the fossil record!"

“Is that so?” said Blue Beard, looking to his own personal computational device. “Then perhaps you can explain this quote from Mark Ridley in New Scientist.”

“In any case, no real evolutionist, whether gradualist or punctuationist, uses the fossil record as evidence in favour of the theory of evolution as opposed to special creation.”

(Ridley, Mark, “Who doubts evolution?” “New Scientist”, vol. 90, 1981, p. 831)

“You’re just quote mining!” Carl shouted. “None of this means anything!”

“Even if all of these quotes are wrong,” I said, “it wouldn’t help evolution, since the fossil record can’t be relied on to be complete.”

“”What does that mean?” asked Carl.

“It means,” I said, “that even if we find things in the order you suggest we do, it wouldn’t matter because we know things can live without leaving fossils when they die. If we found only worms in the lowest rock layers, that wouldn’t prove that fish weren’t already there at the same time. It would only prove that they didn’t get fossilized.”

“Nonsense,” Carl replied. “The fossil record was fairly incomplete in Darwin’s time, but we’ve found billions of fossils since then. You can’t appeal to a lack of fossils to say the record isn’t Darwinian.”

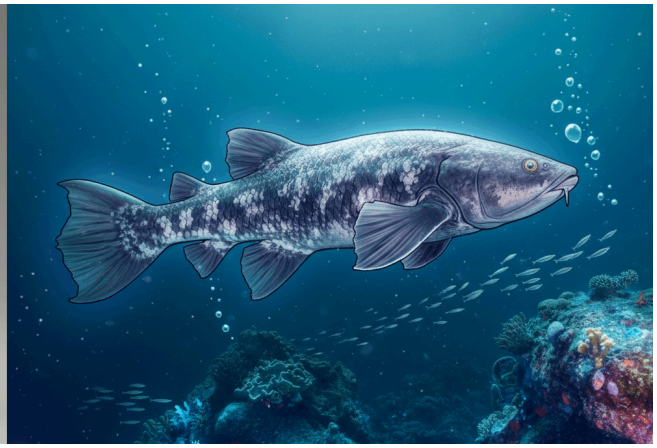
“Not what I’m doing at all. Have you ever heard of the coelacanth?” I asked. The boys indicated that they had not, and so I continued. “It is a wide, fat flippered fish which shows up in rocks dated by evolutionists as 80 million years old, and then they don’t show up in any rocks more recent.”

“So it either went extinct or evolved into another kind of animal,” suggested Carl.

“Or, it simply failed to leave any fossils for 80 MILLION years,” I replied.

“That’s pure speculation. The only way you could know that is if we found one still swimming around in the ocean today.”

“Funny you would say that,” I said pulling out my personal computation device. “Here’s a picture of one. We’ve been finding them for decades, swimming around in the ocean.”



“That fish is a…a living fossil?” Tom murmured.

“And he’s not alone,” I said. “There is a long and growing list of plants and animals which evolutionists say went extinct millions of years ago- based on the fossils- which we find living on earth today. There are literally HUNDREDS of ***living fossils***.”

“Just because Natural Selection didn’t cause them to change or go extinct,” interjected Carl, “doesn’t mean this is evidence for your religious mythology.”

“What it proves,” I said to him, “is that, if we accept your dating methods, something can live for 80 MILLION years without leaving a fossil. If he was here for 80 Million years AFTER his LAST fossil, how can we possibly say he wasn’t around BEFORE the FIRST fossil? Very simply we can’t.”

“Oh my goodness,” said Tom, the light bulb in his head illuminating. “That’s true! The fossil sequence assumes that the earliest fossil marks when the species evolved- first came into being, and the last fossil tells us when they went extinct. But how can we know that? All things being equal, this fish could have lived 80 million years BEFORE his first fossil. Or more!”

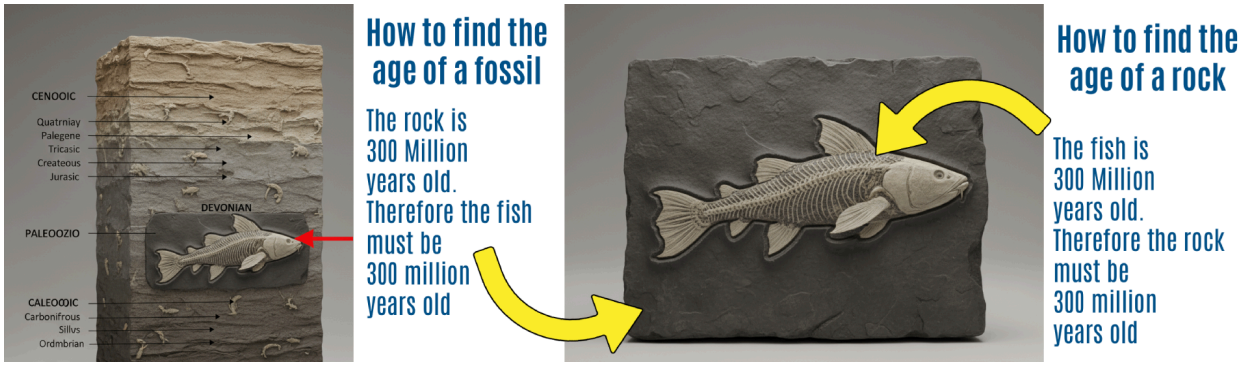
“Well, that would be true,” I said, “if there were millions of years in which to live. But I suggest we make that a topic of another night. Right now I think we just need to face the fact that the fossils can’t give an evolutionary progression because they are not found in any Darwinian order, *and even if they were*, we can’t know merely from fossils if a species existed when a rock layer was laid down.”

“The rock layers,” continued Carl, undaunted by information, “are found in ascending ages from billions of years old to modern rock, with the Darwinian progression we expect found in the rocks of the appropriate ages!”
“And how do we determine the age of those rocks?” I asked. “The ones with the fossils in them.”
“With science,” said Carl, being as specific as I had become accustomed to him being. “Radiometric dating is a fail-proof method of determining the age of rock layers. Many different radio dating methods can be used, from Carbon 14 dating to Potassium Argon dating, and they all agree, and support the Evolutionary timeline.”
“Carl, you make me sad,” I said.
“Because you’re starting to see that science disproves this silly religious view of yours?” Carl said smugly.
“No,” I said, gazing into my nearly empty root beer mug. “Because you show how very badly public schools have failed.”
“Typical,” said Carl with a dramatic eye roll. “I show the gaping hole in your theory and you turn to name calling.”
“What name did I call you?” I asked.
“Well… it was implied.”
“What I said was meant to imply that your time in what I am certain was an expensive university failed to teach you the simplest truths about radio dating techniques or geology.”
“I took an overpriced Geology class in college too,” said Tom, “and I believe that I was taught the same things Carl was taught.”
“I don’t doubt it,” I said. “I took similar classes. But what you learned was incomplete. Or simply wrong.”
“Oh, once again,” said Carl, revving up to what was certain to be a rant, were he given long enough time to accelerate, “Rent-A-Friend is going to explain to us how he knows more about science than all of the college professors teaching in their field at all the schools in the country.”
“Don’t forget to demand my transcripts,” I reminded him. “And of course you’ll need to see several science papers supporting my position which are published in peer reviewed journals, since, as we all know, science which isn’t initially printed in peer reviewed science journals isn’t real science.”
“Finally, you’ve said something true!” exclaimed Carl.
“Something true about Darwin’s Origin of Species,” I said. “So, I suppose then you’ll concede that it isn’t real science? Since Darwin didn’t go through that whole peer review process? Or get a degree in a science field from an accredited college?”

Carl stammered for just a moment and then replied, “Oh, well, I see that we’re going to go off on a rabbit trail about history now that I’ve shown your ignorance about science itself, eh?”
“Carl is absolutely right,” I agreed. “What was I saying?”
“You were saying, “said Tom, “that we can’t date fossils using radio methods? Was that your point?”
“Almost,” I said. Wendy was in the process of dropping off a root beer for me. “Thank you my dear,” I said. “Say, Wendy? You took Geology in college, yes?”
“Yes, that’s right,” she said.
“What kind of rock are fossils found in?”
She thought for a moment, fiddling with one of her braids and then replied, “Mostly sedimentary but also some conglomerate.”
“And what is common about both types of rock?” I asked.
“They are formed in water,” she replied. “Most rock layers are sedimentary rock, which means they were laid down in water.”
“And can you use radiometric dating to determine their ages?” I asked.
“Yes… well, not directly,” Wendy said. “See, Radio dating methods are primarily used on volcanic rock. So you can’t determine the age of sedimentary rock directly with those methods. If you find sedimentary rock between two layers of volcanic rock, you could date those volcanic layers using radio methods and then assume the layers between to be somewhere in the middle.”
“So you can’t use ANY radio dating methods on fossils?” I asked.
“Well, you could use Carbon 14 dating,” Wendy explained. “But since that method is only good for once living things which died no more than, oh, a hundred thousand years ago, you wouldn’t expect to find any C14 in most fossils.”
“What would it mean if you were to find C14 in a fossil?” I asked.
“Well, simply it would mean that the plant or animal you were testing must have died less than one hundred thousand years ago. Otherwise all of the C14 would have decayed and there would be none to find.”
“So if we tested dinosaur fossils, coal, or diamonds?” I asked.
“Oh, no,” she said. “Those are all supposed to be millions of years old. Finding C14 in those would be like finding a still burning candle in a sealed Egyptian tomb.”
“What about soft tissue?” I asked. “Skin, bones, and blood? Not impressions of them, but the real thing?”

Wendy shook her head. “That’s out of my pay scale. Bill, how long does flesh last?”
“When you cover it in buffalo sauce,” said Bill, “About four seconds!”
Wendy laughed. “That reminds me,” she said, “I need to check with the kitchen. I’ll be right back.”
“And when it’s not covered in buffalo sauce?” I asked.
“Well, in the best conditions,” Bill explained, “any living matter will decay in less than 50,000 years. Collagen will last less than a million years. Those mummies they have in the museum, for example, are only a few thousand years old. But the museums still have to work hard to keep them from falling apart.”
“Fascinating,” said Carl, “but I can’t help but feel that Frendius Renticus is leading us away from his intellectual failure.”
“Did you not hear what Wendy said?” I asked. “You can’t date fossils with radio dating methods. Except carbon 14 dating, which in fact shows they cannot be older than a hundred K.”
“You can’t use C14 dating on rock!” said Carl. “Don’t you know anything?”
“I know that,” I said. “I didn’t say rock. I said fossils, which, in those cases, are not made of rock but are made of plant and animal. Skin, bone, blood, wood, ink. Dinosaur skin, bone, and blood just to name one example.”
“Impossible!”
“That’s what Mary Schweitzer said when she discovered it,” I told him. “But it’s not uncommon. It’s just been kept under wraps. Dinosaur soft tissue has been found multiple times over the past century. Tissue and cells from bone, blood, and skin have been found from more than a dozen species of dinosaurs.”
“Hold on,” said Tom. “How do we determine the age of fossils if you can’t use radio dating methods?”

“Simple,” I said. “With evolution.” The look on Tom’s face told me he had registered my reply as nonsense, so I continued. “The rock layers- the geological column- as you find in your geology textbook are not found in that order in more than one percent of locations on earth. This, of course means that 99% of the rocks on earth are, according to deep time, evolutionary geology, in the “wrong” order. Sometimes they are entirely reversed, in which case it’s called an Overthrust. Sometimes GREAT amounts of time are missing- hundreds of millions of years. Those are called an unconformity.”
“Hold on now,” said Blue Beard. “How does one know that layers are in the wrong order, or that millions of years are missing? If you can’t radio date them I mean.”
“The way we determine the age of those rocks is with Index Fossils” I replied.
“What is that?” asked Tom.
“That’s when we use the common fossils in a rock layer,” explained Carl, eager to interrupt, “to determine the age of the rock.”
“So if you find a fossil in a rock layer which is a 300 million year old fossil?” I prompted.
“Then obviously you are looking at a rock layer which is 300 million years old,” said Carl. “It’s not rocket science.”
“And how does one determine the age of a fossil?” I asked. “As we cannot radio date them?”
“There’s a chart of index fossils in any Geology Textbook,” Carl explained. “You check the chart and see when your fossil lived.”
“And how did we create this chart?” I asked, wishing Carl would do more of the leg work for me. I don’t mind prompting him, but he so often seems like he’s happy with a bumper sticker’s worth of information.
“It was created,” he said, annoyed, “by putting living things in the proper evolutionary sequence. Marine invertebrates at the bottom, mammals at the top.”
“But, that means you are using evolutionary theory to build the list of index fossils,” said Tom.
“That’s right,” said Carl.



“And then you use that chart to determine the age of rock layers, based on what fossils are found in the layers.”

“Yes?” replied Carl, not seeing what the problem was.
“And then you label the fossils based on what rock layer they are found in.” Tom paused thoughtfully for a moment. “If I find a fossil in a layer which I know to be 300 million years old, I know the fossil is 300 million years old.”
“Naturally,” said Carl, beginning to grow suspicious.
“And you claim that the fossils show evolutionary gradualism?” Tom asked. “That the fossils, when put in order according to these dating methods, show a progression consistent with Darwinian Evolution?”
“Now you’ve got it!” said Carl, and he drank to his own great success.
“But,” said Tom, his little grey cells popping into light as the pieces came together, “that means you use evolution to determine the age of the fossils, and then use the fossils to date the rocks, and the rocks to date the fossils, and then use the rocks and fossils as evidence of the evolution which you had to assume to begin this process in the first place.”
“What are you saying?” asked Carl.
Sometimes it really seems like he doesn’t have a native language.
“I’m saying this whole thing is circular reasoning!” exclaimed Tom. “Fossils date the rocks and the rocks date the fossils! This is like using two different inch-rulers to measure the other for accuracy. First one is right, because the second one says so. How do we know the second one is accurate? We measure it with the first one!”
“Hey! That’s good right there!” said Blue Beard.
“And you are using the fossils as evidence for evolution, when the only reason you can is because you interpret the fossils using the evolutionary assumptions to start with!”
“No,” said Carl. “That’s not… I mean there are lots of… Look…”
“If the rock layers are found out of order,” Tom continued, his eyes wide, “then the fossils aren’t found in the evolutionary sequence, are they?”
“Well, no,” said Carl. “Not always… But that’s because of geological processes which can invert those layers…”
“Which means that, unless we began with the evolutionary assumptions, we’d never conclude the evolutionary sequence from the actual fossils, would we?” demanded Tom. “We’d never even determine those layers to BE out of order, would we?”
“Of course we would!” shouted Carl.
“Why? Why would the fossils, found as we find them, point toward Darwinian Evolution?”
“Well, because we could arrange them…” Carl’s voice trailed off and for a moment it looked like he was thinking. “Look, you just show me some peer reviewed scientific journals which say the same thing these religious fanatics are saying and I’ll listen to it, but otherwise, this conversation is over!”
I’ve got to give it to Carl. He is reliable. By which I mean predictable.

By which I mean embarrassing.

Also reliable is our affable waitress, Wendy. She brought the conversation to a close with the intrusion of a huge pile of nachos, placed in our midst like a tropical isle in a vast sea of Thursday nightness.

Except for the occasional giggle from Blue Beard, the next few minutes were smothered in the sound of Nachos being consumed. Tom maintained the look of deep thought which he had, and over the next couple of days I would receive a handful of emails from him asking for sources supporting the position he had begun to see. Thankfully, that was not hard to do. The easy thing about stating the truth is, it's a lot easier to defend.

** Quoted from http://commondescent.net/articles/Raup_quote.htm*

Defining Evolution 17: Molecular Clocks

There was a very popular song when I was younger which expressed the theme, “Everybody’s Working for the Weekend.” While there is something to be said for the Friday night whistle before the two days reprieve from the fluorescently-lit daily grind, there is something even more special about Thursday nights, and that something is Nachos. Every Thursday I meet my friends Bill, Carl, Tom, and Captain Blue Beard at Danny’s Bar, Grill, and House of Rabblerousing for friendship, food, and mutual sharpening of the old wit. Nothing keeps the old gray matter jogging uphill like friends with keen minds pursuing some matter of debate together. Of course, experience tells us that the gray matter takes a bit of a break once the oxygen is diverted from the head and into the great quantities of Nacho which will be consumed. As soon as we have our frosty mugs of root beer, the clock is ticking.

On this particular Thursday night that metaphor was apt as our good friend Carl had once again come prepared to defend his consistent assertion that Evolution is supported by “Mountains of Evidence.” As far as I could tell, we had well and good swept his mountain into a molehill, but Carl was nothing if not tenacious. He was the intellectual equivalent of a bought with the flu. But I digress.

When I took my seat and had enjoyed my first taste of root beer, I noticed on Carl's face the smug look of superiority which told me that I was about to be treated with an education from some fountain of knowledge, such as Wikipedia. "What, ho, Carl?" I said. "Something on your mind?"

"I did a little homework," Carl replied, "in order to help you poor religious zealots to overcome your scientific deficiencies."

"Do tell!" I said with almost sincere enthusiasm.

"The modern study of genetics," he continued, "has opened up new worlds of information which have continued to provide solid evidence for Darwinian Evolution."

"Well, that's funny!" exclaimed Blue Beard. "I thought we dealt with the '*solid evidence*' when we looked at the fossil record!" Blue Beard laughed at his own pun. "But as I recall, that didn't work too well for Darwin there, did it, lad? It seems to me that instead of providing mountains of evidence, Darwin was literally failed by the evidence in the mountains!" Once again Blue Beard laughed at his own pun, and then washed it down with some root beer.

"As I was saying," continued Carl, never one to be derailed by information he disliked, "the study of genetics has provided more scientific evidence for evolution. Just as one example, molecular clocks have provided undeniable proof for common evolutionary ancestries and ongoing evolutionary change."

"I think if we've proven anything," I suggested, "it's that there is no such thing as undeniable proof. But I digress. I suppose we need to ask what a molecular clock is."

"I thought you might," said Carl, pulling his notes out of his briefcase. He read to us the following:

> ***"The molecular clock is a technique that uses the mutation rate of biomolecules to deduce the time in prehistory when two or more life forms diverged. The biomolecular data used for such calculations are usually nucleotide sequences for DNA or amino acid sequences for proteins.***
>
> *https://en.wikipedia.org/wiki/Molecular_clock*

"Wikipedia," I noted. "How unexpected."

"There's nothing wrong with Wikipedia," said Carl.

"Of course not," I replied half-heartedly. "But I still think you might help us understand this molecular clock business. I don't think the Wiki has made it clear as crystal for me."

"It's very simple," said Carl in his best scholarly tone. "We can use genetic and molecular studies to determine when related species branched off of their common ancestor."

"Clear as mud," noted Blue Beard.

"Maybe an example would help," suggested Tom.

"Yes," said Carl. "Of course. Well, we know that humans and chimps branched off of their most recent evolutionary ancestor about five million years ago. We also know from

genetic studies that chimps and humans are about 98% similar in our DNA, which means we can prove that our evolutionary changes have been happening at a rate of one percent of our DNA every two and a half million years."

"And this proves, what again?" asked Bill.

"It proves," said Carl in that tone he gets just before I explain to him what he's actually said, "that chimps and humans had a common ancestor five million years ago, and we've been acquiring genetic changes via mutations at a rate of one percent of our genome every two and a half million years."

"So let me get this right," I said in that tone I get just before I explain to Carl what he's actually just said. "We're going to use the rate we can't measure, of a process we never observe, to determine how long ago something we didn't observe… happened."

The light of understanding began to flicker in the eyes of my friends, causing each a slightly different mental and emotional journey.

"Sometimes," I added, "when you describe something accurately, it sounds like you are being sarcastic when you are not. This is one of those times."

"You obviously just don't understand," said Carl. "Maybe this will help. Here's a quote from *http://www.evolution.berkeley.edu/evosite/evo101/IIE1cMolecularclocks.shtml.*"

> ***Over the course of millions of years, mutations may build up in any given stretch of DNA at a reliable rate. For example, the gene that codes for the protein alpha-globin (a component of hemoglobin) experiences base changes at a rate of .56 changes per base pair per billion years.***

"Who's been tracking the mutations in that gene for billions of years?" asked Blue Beard.

"No one, obviously," replied Carl. "We can figure these things out by examining evidence left over from earlier stages in earth's evolutionary history."

"How that?" asked Blue Beard.

"Well, I'm sure they compared DNA from ancient life to today's," said Carl, losing steam.

"The half life of DNA is just over 520 years," said Bill. "That means in seven million years every single bond is broken and the DNA is no more."

"How old are those dinosaurs again?" asked Blue Beard. "About ten times that, according to you, eh Carl? But still, no BILLION year old DNA lying around to test eh?"

"Look," said Carl, clearly dissatisfied with the direction the conversation had taken, "I don't know exactly how they figured it out, but they did."

"I'm sorry, Carl," said Tom. "I still don't understand the significance of this."

"Molecular clocks tell us how regularly mutations happen," explained Carl. "These guys have been trying to argue that evolution by genetic mutations is impossible because of how complex DNA is and all of that, but these molecular clocks show how probable it is since, say in this chimp and human example, we only need the DNA to acquire a one percent change in their genome every two and a half million years."

“Say, Tom,” I said, “you’re good at math. How about you help Carl here show us how easy this is for evolution to accomplish?” Tom and Carl both looked confused, but Tom agreed to be of service. “Carl, tell Tom here how many nucleotide base pairs humans have.”

“We have about three billion,” he said.

“And you said that chimps and humans have genomes which are a mere, what, 2% different?”

“Hang on,” interjected Blue Beard. “How do you figure that? Is that true?”

“It’s not even close to true,” I said. “And it is a very funny story overall, but for right now let’s just assume it is true and continue the story as if it were.”

Blue Beard agreed and Carl got that look that tells me he’s starting to think I’m up to something. I would think that by now I was getting rather predictable, but Carl doesn’t like to get bogged down in the details. “So, we have three billion base pairs,” I said, “which are, over all, only two percent different than chimps, meaning a change of… Tom, what is two percent of three billion?”

“Two percent of three billion is sixty million,” said Tom.

“And sixty million changes over five million years is how many per year?”

“Twelve changes per year.”

“That’s nothing!” exclaimed Carl.

“But humans and chimps don’t reproduce every year,” I reminded us. “So, let’s say it’s every fifteen years.”

“That’s 180 mutations per generation,” said Tom. “Assuming this whole thing is regular, you know. Like Clockwork.”

“That’s the idea!” said Carl. “And look how easy it is to collect these simple mutations!”

“And this is where I remind us,” I said, “that we know of almost 400 places in the genes that make blood cells where as little as ONE nucleotide change can destroy us.”

“You’re just trying to change the subject,” huffed Carl.
“The subject is the rate of mutations,” I reminded him. “But mutations are far more likely to be lethal than helpful. Even if we assume everything you’ve said here about our DNA mutating by 180 nucleotides per generation, you have only stumbled upon a new and scary feature of modern genetics - ***genetic entropy***.”
“What’s that?” asked Tom.
“Genetic entropy,” said Bill, filling in the medical gaps for me, “is what we call it when neutral mutations build up over time until they become lethal. They are like tar in your lungs. The amount from your first cigarette probably won’t kill you, but over time the tar builds up until your insides resemble a fresh parking lot. Some small mutations can kill us, but even when they don’t, they eventually add up in a couple generations until they become lethal.”

“If that was true, then we’d all have gone extinct millions of years ago!” insisted Carl.
“Funny you should say that,” I said, again searching into my personal computation device. “Because that’s the question a lot of people are asking. Even in the title of this article, the problem is acknowledged:

> ***“Contamination of the genome by very slightly deleterious mutations: why have we not died 100 times over?”***
> *by Alexey Kondrashov, Journal of Theoretical Biology 175:583–594, 1995.*
> *(Sited in http://creation.com/time-no-friend-of-evolution)*

“So when you study this molecular clock,” I continued, “and see how fast mutations are accumulating, you find that those mutations are harmful - either immediately or in a few short generations. They cause things like cancer and birth defects. The conclusion is

that we can NOT have been on the planet for a hundred thousand years, or we'd have gone extinct already."

"But if all these mutations are doing is killing things," said Tom, "then why are people claiming the molecular clock to be evidence of evolution?"

"It's because they are assuming evolution to be true and then wedging the data into that model, just as they do with the fossils."

"You're just begging the question!" exclaimed Carl. "You're only rejecting the conclusion because you reject evolution, so you're guilty of the same logical fallacy you're trying to accuse me of!"

"A mind like a steel trap!" added Blue Beard with a smile. "Let's think about the facts of the case for a moment without any presumptions," he said. "Genetic studies tell us two things.

"First, that ***mutations happen regularly*** enough that every generation gets more than a hundred changes to their DNA.

"Second, that ***as little as ONE change can kill us***. Now, Carl, which conclusion do the facts lead to? Evolution over millions of generations accidentally writing thousands of new genes, or the idea that our species was made six thousand years ago with a perfect genome which has been breaking down over time?"

Carl refused to answer. I optimistically try to take this as a good sign.

"There is one more thing," added Bill. "Genetic studies don't show one to two hundred mutations per generation. It's actually much more than that. Either way, genetics are the Achilles heel of deep time. The longer any species is on earth, the more likely it is that they SHOULD have gone extinct already!"

"The conclusion seems obvious," I said, "but there's an even bigger objection to this molecular clock business. **Stasis**."

"What's stasis?" asked Tom.

"Stasis is what we call it when things don't change for long periods of time. Now, as you know, I don't buy the deep time dates, but let's assume them to be true for a minute. You know what a horseshoe crab is?" Tom nodded, so I continued. "Well, according to the fossil record, and the evolutionary assumptions that go with it, those guys have been on earth for five hundred million years."

“Five hundred million years?” echoed Tom with surprise. “That’s a long time.”
“And the point is,” I clarified, “if you assume the molecular clock to be legitimate, meaning that DNA is changing every generation with regularity, then how do you explain a species remaining unchanged for hundreds of millions of years? But if you can claim a species HAS remained unchanged for five hundred million years, how can you possibly claim that DNA is evolving at a predictable and constant rate?”
“There goes all the wind out of your sails, eh Carl?” added Blue Beard. “If stasis can keep some creatures like the coelacanth and the horseshoe crab the same for hundreds of millions of years, then of what value is that “molecular clock” you’re arguing for? If mutations happen so regularly that they can be used as a clock, then stasis should not be happening at all, let alone for so many species for such vast amounts of time.”
“Yet, stasis is not rare,” I said. I read the following quote:

> ***Fossil bacteria dated 3.55 billion years “…look identical to bacteria still on Earth today.”***
>
> *-Peter D. Ward, Donald Brownlee,*
> *Rare Earth, Why Complex Life is Uncommon in the Universe, 2000, p. 57.*

“If something can remain unchanged for 3.55 BILLION years,” I said, “then there might be less to this evolution thing that the brochure leads us to believe.”
“Oh, now, if we’re quote mining,” said Bill, “then I have something to add. Listen to this.”

> ***It is often convenient for evolutionary biologists to assume that certain proteins evolve at a fixed rate. Such proteins can be used as “molecular clocks,” since one can use them to estimate when species diverged. However, these clocks sometimes behave in an erratic manner which calls into question their use and even the entire theory of evolution.***
>
> *http://www.cs.unc.edu/~plaisted/ce/clock.html*

“And here’s another which says something similar.”

> ***Even supporters of the rate constancy hypothesis acknowledge the fact that molecular clocks can, in fact, behave erratically. Some genes have been shown to evolve at disparate rates across genes and lineages and over time (Ayala et al.1998). A great deal of data exists that shows this variation.***
>
> *http://www.as.wvu.edu/~kgarbutt/QuantGen/Gen535Papers2/Molecular_Clocks.htm*

“Would it be all right,” asked Blue Beard, “if I quote from a creationist source?” Carl immediately said “no,” but the rest of us gave him the nod of affirmation, so he read us the following:

> ***Despite the fact that the genetic clock data are clearly manipulated to conform to vast amounts of evolutionary time, the results rarely support the overall evolutionary story. In fact, the following problems are often encountered.***

1. ***Different genes give widely different evolutionary rates.***
2. ***Different types of organisms exhibit different rates for the same type of gene sequences.***
3. ***Genetic-clock dates that describe when these creatures supposedly split off to form new creatures (called divergence) commonly disagree with paleontology's timescale despite being calibrated by it.***
   http://www.icr.org/article/9002

"I've got one as well," I said, and read the following.

> ***Perhaps the most remarkable data supporting a young creation were recently published by a large group of secular scientists who are involved with mapping DNA variation across the entire human genome. This massive effort has just produced a huge dataset that the researchers call "a global reference for human genetic variation." In their report, they state: Analysis… suggests a median common ancestor ~296 generations ago (7,410 to 8,892 years ago), although those confined within a population tend to be younger, with a shared common ancestor ~143 generations ago (3,570 to 4,284 years ago).***
>
> *(The 1000 Genomes Project Consortium. 2015. A global reference for human genetic variation. Nature. 526 (7571): 68-74.)*
>
> *http://www.icr.org/article/9002*

"That sounds like they're saying," said Tom analytically, "that all humans have a common ancestor somewhere between 9,000 and 4,000 years ago."

"Almost," I said. "They're saying that these genetic studies show a common human ancestor - Adam and Eve - between 7 and 9 thousand years ago."

"There goes your six thousand years!" said Carl.

"It's a lot closer to my six thousand than to your hundred thousand," I reminded him. "But this quote is also saying that, for any one population, they had a common ancestor about three and a half to four thousand years ago, which would have been around the flood- so Noah and sons- or at the Tower of Babel dispersion event from Genesis chapter eleven."

"So what?" said Carl. "What does that prove? It still shows the human race too old for your Bible stories."

"It literally doesn't," retorted Blue Beard. "It supports two different parts of the Genesis account."

"I have another quote which clarifies it a bit," I said, reading the following.

> ***The review in* Science*'s 'Research News' goes still further about Eve's date, saying that 'using the new clock, she would be a mere 6000 years old.'***
>
> *http://creation.com/a-shrinking-date-for-eve*

“So you’re saying,” said Tom, “that this molecular clock business has been used to prove that, the first female human lived 6,000 years ago?”

“How about that!” exclaimed Blue Beard. “Isn’t that exactly what the Bible says? Well now Carl, there might be something to this genetic clocks business after all!”

Carl had no comment, and it was just as well that Nachos soon filled the silence that followed Blue Beard’s comment with the heavenly sound of crunching chips covered in everything good. The clock had run down on our science fisticuffs, but I had a feeling that another bought might be waiting on Thursday next.

Defining Evolution 18: Homologous Features

I was walking through the snow-saturated winds on my way to Danny's Bar, Grill, and House of Rabblerousing, cursing the name of former Vice President Al Gore and wanting to scream out loud, "WHERE IS MY GLOBAL WARMING!?!?"

You see, it was April, a time when, traditionally, the sun comes out and flowers bloom and temperatures sore ABOVE FREEZING.
Yet here I was, slogging my way through puddles of slush, and squinting into curtains of huge, fluffy white snow.

I was last to arrive at our round table in the back near the dartboard, and my friends Carl, Tom, Bill, and Captain Blue Beard were already warming up with root beer and mozzarella sticks.
"Where is my global warming?!?!" I finally blurted out.
"It's climate change now," answered Bill.
"What? Since when?" I asked.
"Since a few years back," Bill explained. "There was this huge, multinational meeting on global warming in Washington, and on the day of the meeting some of the attendees couldn't make it due to snow."
"I remember that," said Blue Beard. "On the same day, there were snowfall in places what hadn't seen snow in almost a century. I figure it's a bad sign when you're trying to get people to join the fight against global warming on a day with record snow."
"I think they missed a prime opportunity," suggested Tom. "If I were them, I would have declared our meeting a tremendous success. Only *one meeting* and we've beat back the heat until it snowed in the Amazon!"
"Hey, that's funny right there!" exclaimed Blue Beard, giving Tom's root beer a celebratory dink with his own.

“All that to say, it’s climate change now,” said Bill. “Because once they started trying to blame snow on warming, they realized they needed some new terminology.”
“I guess I shouldn’t be surprised,” said Carl, scowling. “You bunch of nuts aren’t just Darwin Deniers, you’re climate deniers too! What next? Are you going to try to convince us that the world is flat?”
“Hey,” I said, grabbing a mozzarella stick and pointing it at Carl for emphasis, “I’ve been to Hickman Nebraska, and I can tell you - it IS flat.”

“Well now!” exclaimed Blue Beard. “Does this mean three months of arguing about climate change, or arguing about the shape of the globe?”
“I think it means six more weeks of winter,” I said, my socks still wet with snow.
“And the globe is a shape,” said Tom. “You can’t argue about the shape of a ball. The argument is IF the earth is a globe.”
“Well of course it’s a ruddy globe,” said Blue Beard. “Otherwise I’d have sailed off the edge of it by now. Been trying for years.”
“And before we go off on another long discussion about science or religion or something,” suggested Tom, “I have a few more questions about this whole evolution business.”
“Well, certainly, Tom,” I said. “What’s on your mind?”
“I was visiting my folks this weekend, and I was looking through some of my things, and I found a book from college. A biology textbook. While we’ve talked about a lot of the things which it covered in its chapters on evolution, there was something they described in some detail which we haven’t talked about yet; namely homologous features.”
“Ya can’t be serious,” exclaimed Blue Beard. “Your college book says that men wanting to marry other men is proof of evolution?” He scoffed and shook his head. In the silence that followed, he took note of our faces and said, “That’s not it then?”

“No,” replied Tom. “Homologous Features are similar structures which result from common ancestry.”

“Hang on,” said Carl, swiping through his personal computation device. “I have a quote about this subject in here. Listen:

> ***‘If you look at a 1953 Corvette and compare it to the latest model, only the most general resemblances are evident, but if you compare a 1953 and a 1954 Corvette, side by side, then a 1954 and a 1955 model, and so on, the descent with modification is overwhelmingly obvious. This is what paleontologists do with fossils,*** **and the evidence is so solid and comprehensive that it cannot be denied by reasonable people** ***[emphasis in original].’***
>
> *Berra, T.,* Evolution and the Myth of Creationism*, Stanford Univ. Press, p. 117, 1990.*

“Oh,” said Blue Beard.

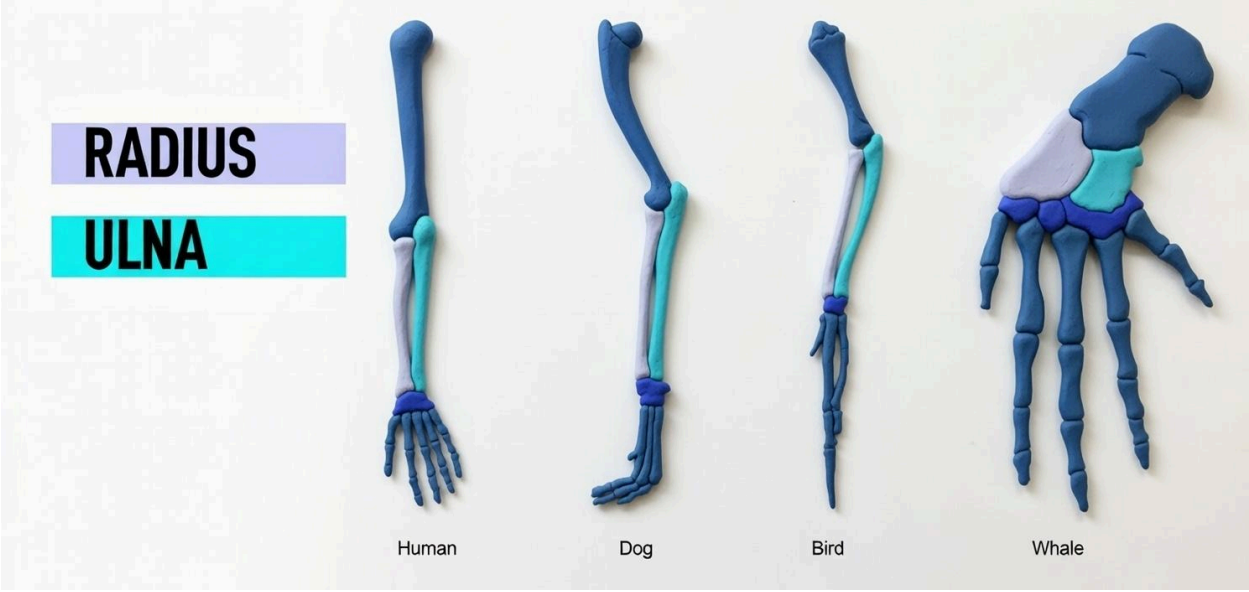
“Does that make sense?” asked Tom.

“Not a bit,” admitted Blue Beard.

“It’s like this, as far as I can understand it from my book and what I recall from school,” Tom began. “When we look at the anatomy and physiology of different plants and animals, we find things they have in common. For instance, the two bones that make up your forearm are called the radius and the ulna, and they allow your hand to rotate around the central axis of your arm like this.” Tom put his hand out and flipped it palm up and palm down, a few times to demonstrate.

“That’s a lot useful,” admitted Blue Beard.

“We have a radius and ulna in our forelimbs, but so do lots of other animals. Rodents, bats and birds in their wings, dogs, cats, and even whales in their flippers have a radius and ulna. The theory states,” Tom continued, “that we all share these features because we, meaning all birds and mammals, have descended from a common ancestor that also had that feature.”



“That does kinda make sense,” admitted Blue Beard.

“Finally!” exclaimed Carl. “One of you can see the logical interpretation of scientific observation! The only reason we would share these features with lesser animals is because we had some common ancestor with those features!”

“Or,” I interjected, happy again to burst Carl’s metaphorical balloon, “because we have a common designer who chose to reuse good pieces of design for achieving a desired result.”

“We’re talking about science here, not religion!” Carl retorted.

“No, *you* were talking about evolution,” I reminded him. “Which is every bit as religious but far less scientific than Biblical Christianity.”

“Hold on now boys,” said Bill. “Before we come out of our corners, swinging, we should make sure the rules are clear. Blue Beard, you get what the idea is now?”

“Yeah. Something in the distant past had a radius and ulna, and that thing was the great great great granddaddy of birds and whales and peoples. So all of us having these bones is a long standing family resemblance.” Blue Beard looked around at us. “Does I got it this time?”

“That’s what I understood,” said Tom. “Carl?”

“For once the pirate is talking sense,” said Carl. “So which would you like to disagree with this time,” he said to me, “observable scientific facts or logic?”

“I’d like to talk about Jackson Pollock,” I said.

“Pollock?” replied Blue Beard. “You mean the fish? Oh, wait, no. I’m thinking Haddock. What’s a Pollock?”

“Paul Jackson Pollock was a painter of sorts,” I said showing one of the images of Pollock’s work I had pulled up on my personal computation device. “He was primarily known for this style of work.”

“It looks like a giant plate of alien spaghetti,” said Blue Beard.

“It looks like he just threw paint at his canvas with no intent to represent a place or object,” added Tom.

“That’s about right,” I said. “But while the work at first seems somewhat random and accidental, you can get to know his style when you study his many works. In fact, one team of researchers studied Pollock’s work so much that they were able to build a robot that impersonated his style.”

“You know, I would love to discuss art history,” said Carl dryly, “but before we continue, I think you need to admit that Homologous Features are obvious evidence for Darwinian Evolution. Just admit that and we can go back to talking paint.”

“My dear Carl,” I said. “You didn’t think I had changed the subject, did you?” Carl’s face registered a slight worry and confusion, so I continued. “I’m making a point about finding similarities in different works. Just as Pollock’s work all show a similar style, many of God’s creations show a similar design. It’s the similarities which help us determine the identity of an artist.”

“You’re begging the question by assuming intelligent design,” scoffed Carl.

“And you’re begging the question by rejecting it,” I said. “Which of course means we are both coming to the evidence with an assumption. But my assumption that God is the creator doesn’t need this piece of evidence to prove it. I believe that God is the creator because He said He was. Then, when I see common design, it makes sense that common design comes from a common designer. However, you are using homologous features as evidence FOR evolution, when your ability to interpret them as homologous features requires you to believe in evolution before you examine the evidence. Once again you’re forced to use Evolution as evidence for evolution.”

“Hold on,” said Tom. “Why can’t the evidence just speak for itself? When we talk about homologous features, we’re just talking about features that different species have in common, aren’t we?”

“Not entirely,” I said. “What makes similar features “*Homologous* Features,” is that both species in question got that feature ***from a common ancestor*** with that feature.”

“Of course,” said Tom. “Where else would common features come from?”

“Where indeed! There is the concept of ***convergent evolution***,” I answered. “Carl, tell Tom all about it.”

Carl had that look of distrust he has when I ask him to explain something, but he did as I asked anyway. “Convergent evolution,” he said, “is when two different species evolve a common feature due to environmental pressures that benefits their survival, when they ***do not share a common ancestor with that feature***. They evolve to have a similar feature as opposed to gaining that similar feature from a common ancestor which already had it.”

“For example,” I said, “bats and dolphins have very similar radar, which I’ve heard even comes from similar genes. But no one believes that bats and dolphins have a common ancestor which had that radar or those genes. Thus, the radar in both of these species is an example of *convergent evolution*. Right Carl?”

“Yes,” said Carl, looking even more concerned that I was saying something with which he agreed. “Yes, that’s right.”

“Which means that common feature shared by bats and dolphins is not a homologous feature. Right Carl?”

“Well, yes. I suppose.”

“And how do we know that bats and dolphins aren’t both descended from an ancestor with that radar system?” I asked.

“Because we know what the common ancestors of bats and dolphins are,” Carl replied. “And none of them have any radar. The radar comes later, and isn’t shared by any of the other species which also evolved from that common ancestor.”

“So to tell homologous features from convergent evolution,” I added, “we have to look at the evolutionary ancestry of the species in question.”

“Yes,” said Carl. “You’re finally starting to understand some real science!”

“But that means,” interjected Tom, “that homologous features can’t be used as evidence for evolution.”
“What? No, of course they can,” said Carl. “What do you mean, Tom?”
“According to you,” Tom continued, “we need evolutionary theory to even know if a feature is homologous or not. But if the evolutionary story has to be established before we can tell if similar features are even homologous, then we can’t say the existence of homologous features are evidence for evolution, can we?”
“What?” Carl stammered. “Of course we can! No, listen. We find similar features, like the radius and ulna in species which descended from an ancestor which had that feature. Thus, birds and bats and humans and whales must have had a common ancestor.”
“But how do you know that the radius and ulna aren’t examples of convergent evolution?” asked Tom.

“Because we know the common ancestor had that feature,” said Carl.
“Meaning we are using an established evolutionary tree to determine if the radius and ulna are in fact homologous features.”
Carl had the slightly pained look he gets when he seems to be thinking. “Well, sort of. I mean, yes. But homologous features are one of the pieces of evidence that we use to build those trees.”
“Are you dizzy yet?” I asked. “Common features are homologous if the Evolutionary tree says the common ancestor had that feature. Then we use the existence of those homologous features to say the tree is valid. Imagine we’re deliberating the guilt of a murder suspect.”
“What does this have to do with…?” began Carl.
“Just applying the same logic to the courtroom,” I replied. “At the scene of the murder, we have footprints. Does that prove the defendant to be guilty? Only if we know they are

his footprints. What Darwin is saying is, “We know the defendant is guilty, so those MUST be his footprints.” But when asked how we know the defendant is guilty, Darwin points to the footprints and says, “We know he’s guilty because we found HIS footprints at the scene of the crime!”

“That’s not what it’s saying at all!” said Carl.

“Then what is it saying?” I asked

“Well,” Carl stammered, “just listen to the quote I read. I think it says it all!

> ***“..if you compare a 1953 and a 1954 Corvette, side by side, then a 1954 and a 1955 model, and so on, the descent with modification is overwhelmingly obvious. This is what paleontologists do with fossils,*** **and the evidence is so solid and comprehensive that it cannot be denied by reasonable people.”**

“So you’re saying that a 1955 Corvette has four wheels because it is descended from a 1953 Corvette which already had that feature?” I asked.

“Yes. Well, no. It’s a metaphor! The point is you can put things in order according to their similar structures to see which came first!”

“It’s a metaphor?”

“Of course! Cars don’t reproduce.”

“So the similar features they have are the result of an intelligent guiding force making decisions for engineering and aesthetic purposes?”

“Yes, naturally.”

“So while the comparison of the Corvettes shows obvious design and intelligent guidance, a similar comparison of similar structures in living things doesn’t show design and intelligent guidance because…?”

“Because living things reproduce!” Carl exclaimed. “They don’t need any intelligent designer. They do these things naturally!”

“Carl,” I said, “if cars could make new cars without our help, and could repair themselves when damaged, and could go out and get their own fuel when their tanks were running low, would that prove they didn’t need a designer? Would that prove that they were made by accident with no intelligence?”

“You’re changing the subject!” Carl exclaimed in frustration.

“No, I’m pointing out the blunder of your quote. This guy uses intelligently designed machines to explain the process he uses to determine an evolutionary sequence from homologous features. He demonstrates that the same sequence can be assembled from similar features even when there was a designer. Thus, by your example and his, similar features can be obvious evidence of intelligent design by a common designer.”

“I think there is more to it than that,” interjected Bill. “Just in terms of anatomy and physiology. Why does every ground vehicle have wheels? Every car has four wheels, right? But is it because they descended gradually from a common bicycle?”

“No,” answered Tom. “It’s because the wheel is a tremendously efficient mechanism of ground movement, and four wheels is more stable than three.”
“Exactly!” said Bill. “All of these cars and trucks have a similar feature because they need to do the same thing! They need to drive, see? And not tip over when they turn. Now,” he said, putting out his hand, palm down, “what do all of these animals need a radius and ulna for?” He flipped his hand palm up, and then palm down a few times.
“They need to be able to flip their forelimb along a central axis?” said Tom.
“There you go!” exclaimed Bill. “Hand, foot, wings, flippers, all need to do THIS.” He demonstrated a few more times, this time with both hands, looking like he was doing some cheap impression of a penguin. “It’s a smart design which works.”

“And that is the key to examining living things,” I said. “Nature has brilliant design at every level. But there are lots of different versions of similar things. For instance, our eyes are very different than the eyes of a squid.”
“Yeah,” scoffed Carl. “The squid eye is better. Human eyes are a stupid design.”
“Oh, is that so?” asked Bill. “As a humble medical doctor, I am interested in the details of this revelation.”
“The human eye is backwards,” said Carl. “The squid retina is unobstructed by anything, so it gathers light more efficiently. Ours is blocked by a network of blood vessels. If your God had designed us, I doubt he would have screwed up something that obvious, would He?”
“Well, funny thing about that, Carl,” said Bill. “But if our eyes were built like a squid’s, we’d go blind from exposure to direct sunlight.”
“What?”
“Those blood vessels don’t block our view, they protect us from radiation which would destroy our photoreceptor cells,” Bill explained. “And their location allows those cells to

receive oxygen very quickly and recover from use, otherwise we would literally not be able to see for more than a few seconds on a sunny day, and might take hours or days to recover if we recovered at all."

"Plus," said Blue Beard, "I think if you toss a squid up in tree, it won't be able to see as well as we do. But those guys got perfect eyes for swimming the briny deep around the coral reef."

"That almost rhymed," I noted.

"Yeah," said Blue Beard. "I'll work on that one for next time. Maybe put it to music."

"And the thing one notices in the human body," said Bill, "as well as in any living thing, is that its design is perfect for what it needs to do, you see. A squid eye is perfect for being

a squid, and our eyes are perfect for us. But there is this irreducible complexity to each design, so that, if you tried to gradually turn one into another, it stops being able to do its job, maybe at all, you see. In fact, when some part of the human body changes shape, even a little, the part stops working as well."

"Speaking of eyes," I added, "this is why I have to wear glasses. My eyes are just a little bit the wrong shape, and that makes me nearsighted."

"Exactly!" replied Bill. "And the same is true of our knees, or blood vessels, or teeth, or anything else. Changing the shape of one of our parts in any significant way is like changing the shape of some part inside a clock."

"Oh, please," said Carl. "You're not really going to use the old "Blind Watchmaker," argument, are you? I think science has discredited that sufficiently."

"First of all, Carl," I replied, "it's not the BLIND watchmaker. Not on our side. Our watchmaker can see just fine, and he knew he was making a watch when he started. Evolution is claiming to be a blind and mindless and purposeless watchmaker. The argument is the argument for design. If a watch needs a designer, then why would not living things, all of which are FAR more complex, NOT need a designer? What similar features show is a common problem being met by a common engineering solution."

"And you, Carl, simply stating out loud that *'science has discredited'* something doesn't make it so," said Blue Beard. "Course, if you want to explain to us how science has proved that complex things don't need to be designed by an intelligence, then by all means enlighten us."

"Natural Selection," began Carl.

"Doesn't make anything new, let alone design anything," said Blue Beard.

"Mutations…" Carl tried again.

"Are a corruption of existing information and have never been seen to add information, let alone design anything," interrupted Blue Beard again.

"Look, Homologous Features…" Carl tried once more.

"Show a common designer using smart designs to give similar functions to different kinds of animals," Blue Beard added. "Good grief, Carl. We been over all of this! None of those mechanism of evolution makes new things! Besides which, I gotta ask, since you know cars need a designer, and we've acknowledged that living things are far more complex, being able to make new members of their kind and self repair and all, how complex does something need to get before it doesn't need an intelligent designer for it?"

Carl did what Carl does best when faced with a question he doesn't like, and that was to sink into stony silence. I took that as an opportunity to wrap up the topic as I could sense the arrival of our Nachos.

"So, Tom," I said, "are you seeing how the existence of homologous features can't be used to support Darwinian Evolution?"

“I think so,” he replied. “It seems that one must already accept not only evolution, but a certain order of evolutionary descent before it would be possible to call two similar structures Homologous in the first place. And considering how each of those structures fulfills an engineering challenge, it certainly doesn’t demand an evolutionary explanation. I can see why you would see design in them individually or collectively.”

“Just like the fossil record,” I said, “I find that Homologous Features require you to first accept the evolutionary story by faith, and then examine the evidence in the light of that faith before it can be seen as evidence for evolution. Once again, evolution is used as evidence for evolution. As for me, I’d prefer to take God at his word when He says He created everything. It certainly makes more probable sense to have a brilliant intelligent designer as the cause of brilliant design.”

But I could say no more about it, as Wendy had arrived with our beautifully designed mountain of nachos. While it could be said that this pile of Nachos was very similar in many ways to the Nachos that had come before, I knew that was no accident of nature. These Nachos were designed by a wise and benevolent kitchen staff that loves us, and shows their love with cheese and jalapeños. Love has many forms. May we always be thankful.

Defining Evolution 19: The Epic Evolution FAIL Slideshow

Another Thursday had arrived, but the story actually begins the night before. What does a Rent-A-Friend do on a Wednesday night? The answer to that mystery can vary from week to week, depending if there is a new Duck Dynasty to watch, but this particular Wednesday night was spent making a holistic, fully encompassing, clip art-saturated Power Point Slide Show Presentation!

Calling on all of my mad office skills and the one semester of graphic design I took in college, I compiled the complete and total summation of information which we had shared on the many Thursdays past and created **the Epic Evolution FAIL slideshow**, Subtitled, "*If you Understand Evolution, You Know Why Its Wrong*," and then sub sub titled "*Chuck D and the New Monkey Band*."

When my friends arrived at Danny's Bar, Grill, and House of Rabblerousing the following night, I was prepared to slideshow present their argyle socks off. And I did. Metaphorically. Although in full disclosure, I did not check the state of their socks at the end, so it remains possible that I mean that literally. But I digress.

When my friends filed in from their nine to fives that night, I had the table ready with fresh root beers and a big flat screen monitor with which to pitch a model of science that would change the world.

“Greetings my friends and welcome to the first, and sure to be remembered as Historic, presentation of

the **Epic Evolution FAIL slideshow**,

Subtitled, ***“If you Understand Evolution, You Know Why Its Wrong,”***

and then sub sub titled “*Chuck D and the New Monkey Band.*”

“Its should be ***it’s***, with an apostrophe,” interrupted Carl. “It’s a conjunction for “It is,” not the possessive.”

I looked at my title screen. “Yes. Yes it should. Look, as with all of my presentations, I think it would be best if we just ignore the majority of my grammatical errors and focus on the point I’m making.”

“Yeah,” said Blue Beard. “If we get to picking at his spelling and punctuation, we’ll be here all night.”

“Thank you Blue Beard,” I said with only a slight hint of irony. “As I was saying...

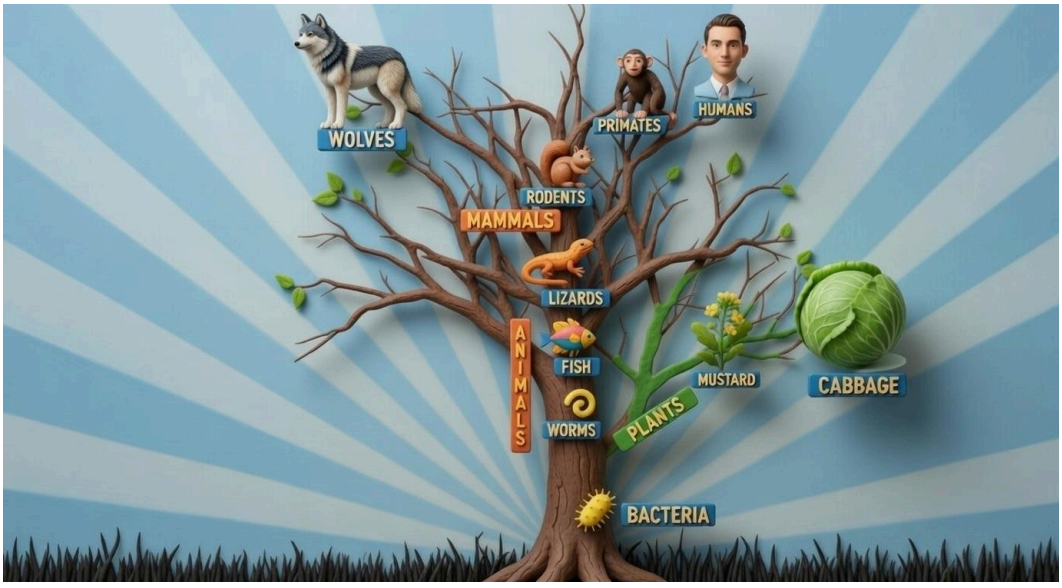
“Just remember that it was your friend at a very reasonable hourly rate, Rent-A-Friend 2000, who brought to you “the world’s first very useful definition of Darwinian Evolution.”

“Are you really going to go through the entire thing?” asked Carl.

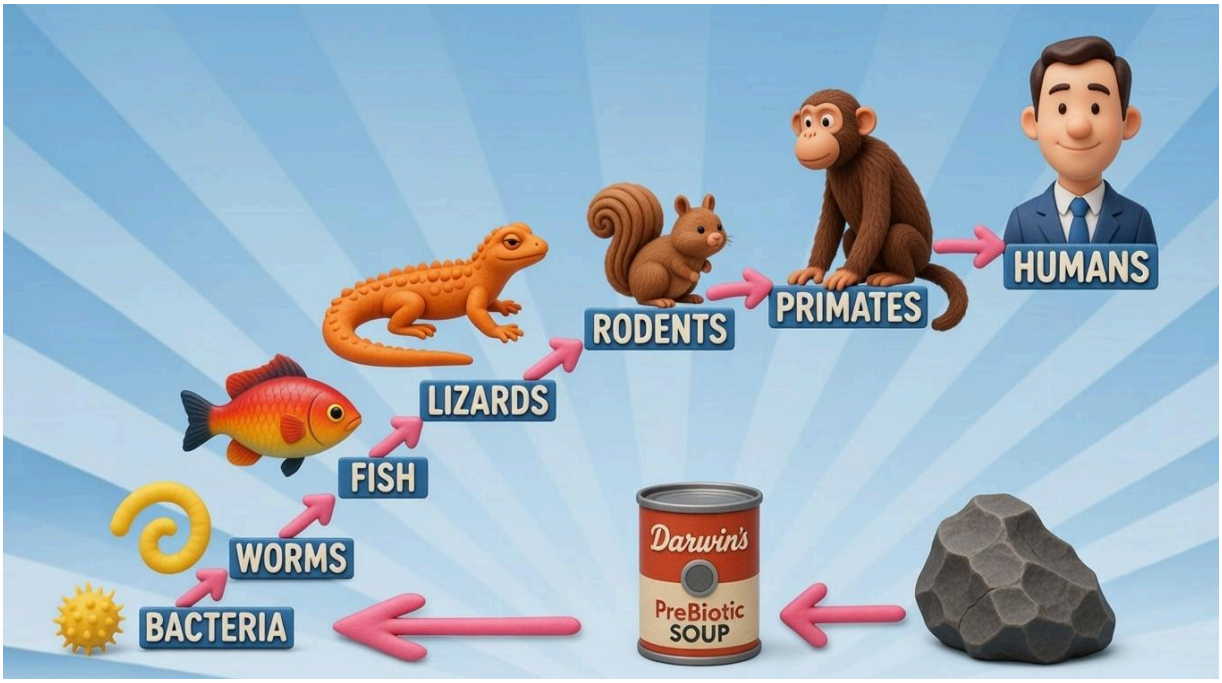
“Yes, Carl, I am,” I replied. “But while we have spent many weeks delving into the details, tonight I shall summarize the big picture and conclude before the Nachos arrive!”

“Well, get to it, lad!” shouted Blue Beard. And so I did.

“The definition of Evolution is created by coming to a clear understanding of what Evolution is, and what story it intends to tell. We start with the Darwinian Tree of life.

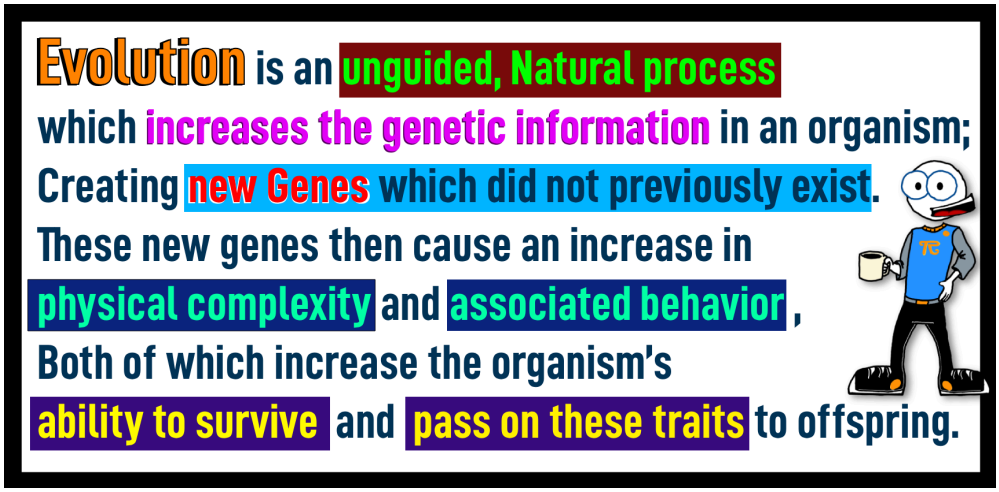


The tree of life is the history of life on earth according to Darwinian Evolution.
In order to grow this tree, **Darwinian evolution must be four things**:
1. Evolution is something to do with living things.
2. Evolution is something about life changing over time.
3. Evolution is something which is intended to explain the origin of different kinds of plants and animals.
4. Evolution tells a story where in all living things arose through past common ancestors until, far enough back in time, we reach a first universal common ancestor, making the history of life on earth a big tree of life. Or going forward in time, it explains how simple things like bacteria became worms which became fish which became lizards which became rodents which became primates which became humans."



In order to give rise to and grow the Darwinian tree of life, thus accounting for all the plant and animal kinds which live now and which have lived in the past,

Evolution is an unguided, Natural process which increases the genetic information in an organism; Creating new Genes which did not previously exist. These new genes then cause an increase in physical complexity and associated behavior, Both of which increase the organism's ability to survive and pass on these traits to offspring.



You shall recall that we discussed the definition in detail and found that no serious argument was made to its premises. This definition takes into consideration the Darwinian Tree of life and the basic story which Evolution is intending to tell. Then, we took this understanding of the Evolutionary Model and examined the proposed Mechanisms of Evolution to see if any of them could cause the tree of life to grow, and new kinds of plants and animals to come into being.

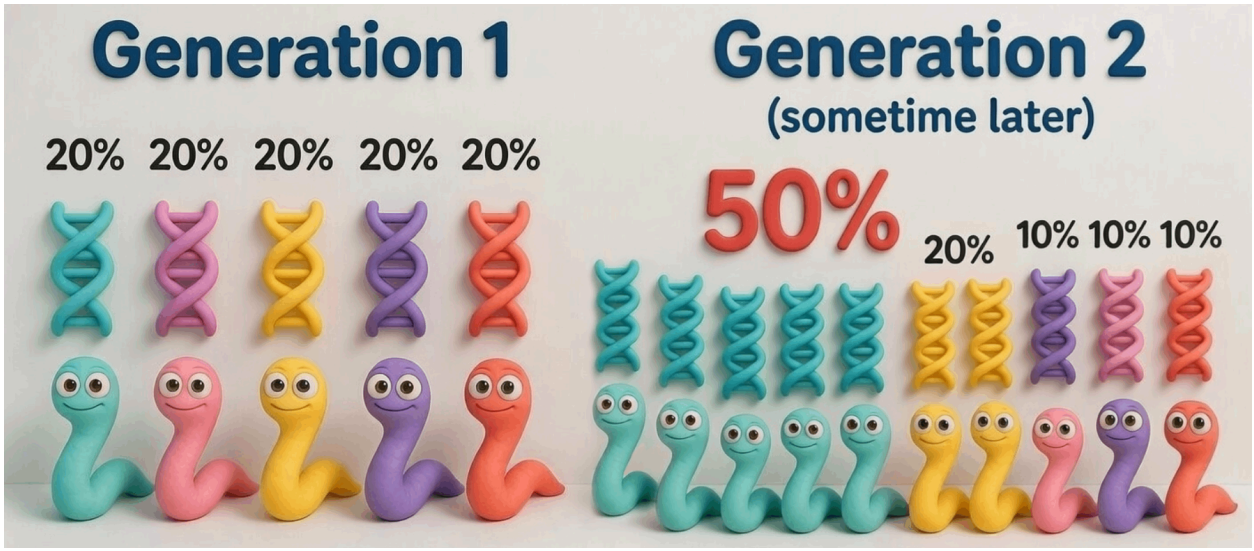
First, with consideration to the title of Darwin's book, we looked at **Natural Selection**. However, Natural Selection cannot be the Origin of any species, because it only removes variations from a species. It does not add any. Darwin said as much in his book, and so this rejection of Natural Selection as a mechanism of Evolution comes from Darwin's own writings, as well as a clear understanding of what it is and what evolution is claiming to do.

Population With Variations | Environmental Stressor | Population After Nature Selects the Fittest

Next we looked at **Genetic Drift/Migration**.

But this mechanism is literally just moving existing things from one place to another. Migration cannot be a mechanism of evolution because it cannot cause a new species, gene, feature or behavior to arise.

Because it is such a popular definition of and proposed mechanism of evolution, we looked at **Changes in Allele Frequency**.



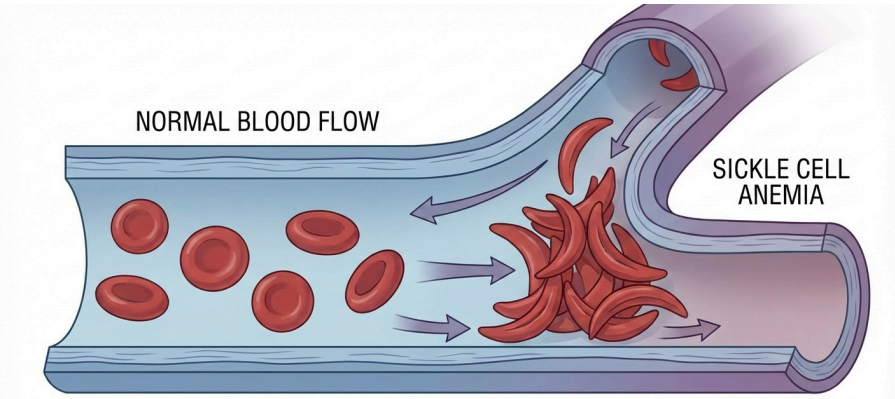
However, *Changes in Allele Frequency* cannot be evolution, as they cannot create new genes, variations, or species. They would in fact be a result of such evolution, were it to occur, thus making it not a viable CAUSE of evolution, as nothing can be the cause and the effect at the same time in the same way. Also, Changes in Allele Frequency can occur because of something as simple as migrations, births, or deaths, and cannot be made synonymous with Evolution. The ultimate failure of this proposed mechanism is that it is a statistical change, not a genetic one. This is mere census information, and cannot be evolution, nor even a mechanism of evolution.

We looked at **Descent with Modification**.

This was rejected because it is so ambiguous that it has no meaning. All this term can mean is “Change over time,” which doesn’t say enough to separate the origin of a species from the extinction of a species, and thus can’t be said to be evolution. Furthermore, we acknowledged that many changes from one generation to the next can result from shuffling existing genes, or losing existing genes, neither of which are evolutionary changes because they do not grow that Darwinian Tree of Life.

We looked at **Vestigial Organs and Structures** and found that, while they are listed on most textbooks and web sites intending to promote Evolution, these are literally the evidence of the LOSS of structures and functions, which is the exact opposite of what Darwinian Evolution is intending to explain.

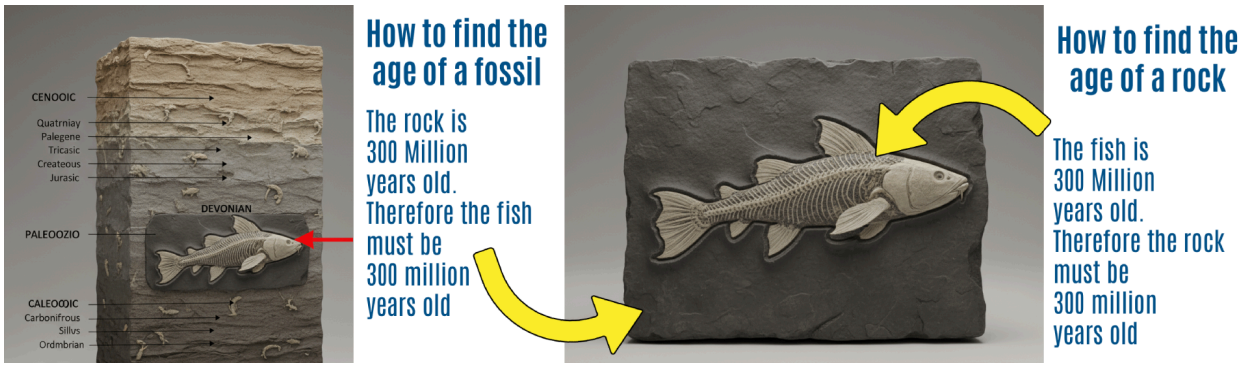
We spent considerable time looking at the favorite mechanism for making, not only new kinds of plants and animals, but comic book superheroes - **Mutations**. Mutations are so unlikely to create new genetic information, and so much more likely to cause damage to existing genes that the creation of a new gene by mutations is essentially impossible.



SICKLE CELL ANEMIA: Abnormal hemoglobin causes red blood cells to become rigid and sickle-shaped, obstructing blood flow and leading to pain and organ damage.

We've never seen a beneficial mutation which adds information to a genome, and have only seen MANY examples of mutations causing harm to existing genes. The odds of mutations making a new functional gene is far less than the odds of flipping a coin heads up a thousand times in a row. Information requires a mind, and genetics, DNA, and the machines of every cell are packed full of information, thus evolution cannot be the cause, but rather, in the beginning, God created.

After we'd examined all of the proposed mechanisms of evolution we looked at more alleged evidence for evolution, starting with **Fossils**. The problem, we discovered, is that the fossils are not found in the Darwinian order, and have to be arranged that way according to Evolutionary Theory. The ages of the rocks and the fossils are based on circular reasoning, where in the rocks date the fossils and the fossils date the rocks, and the entire enterprise once again requires you to accept evolutionary theory as fact before you begin the process, so that evolution can be used as evidence for evolution.

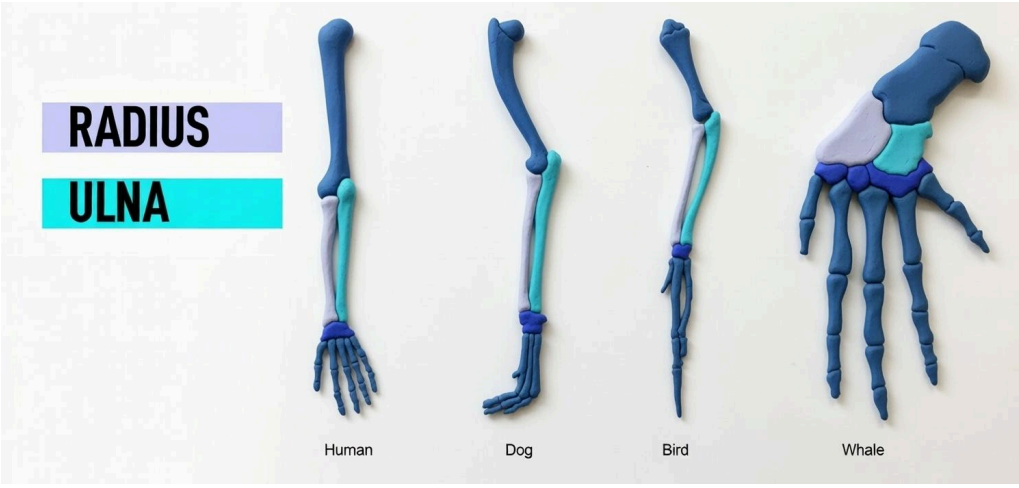


Even worse, the fossils show NO transitional forms, thus showing no evolution happening, even if the deep time, evolutionary dates are accepted. They also show stasis, meaning things staying the same for long periods of time unchanged, which again is evidence of no evolution happening. Finally, the existence of plants and animals called "Living Fossils" prove that even if you accept the evolutionary dates, you cannot construct an evolutionary sequence from the fossils because we can't know,

from the fossils, when an animal was on earth or not, since, if you accept the evolutionary dates, they can be living on earth for millions of years without leaving a fossil.

The next bit of alleged evidence for Evolution was **Molecular Clocks**. Some people try to claim that DNA changes at a constant and predictable rate, but this was shown to be false for several reasons. First, because DNA decays so quickly, we have to extrapolate FAR into the past where no evidence exists, thus making the entire concept speculation with no possibility of evidence. Next, there is no agreement between clocks and the same species can yield different dates depending on what you date and what assumptions you bring to the table. The biggest objection, in my humble opinion, is the fossil record. Evolutionary theory states that the fossil record shows species living on earth, unchanged, for hundreds of millions of years, but clearly if that were possible, it would prove that DNA does not change at a regular and predictable rate.

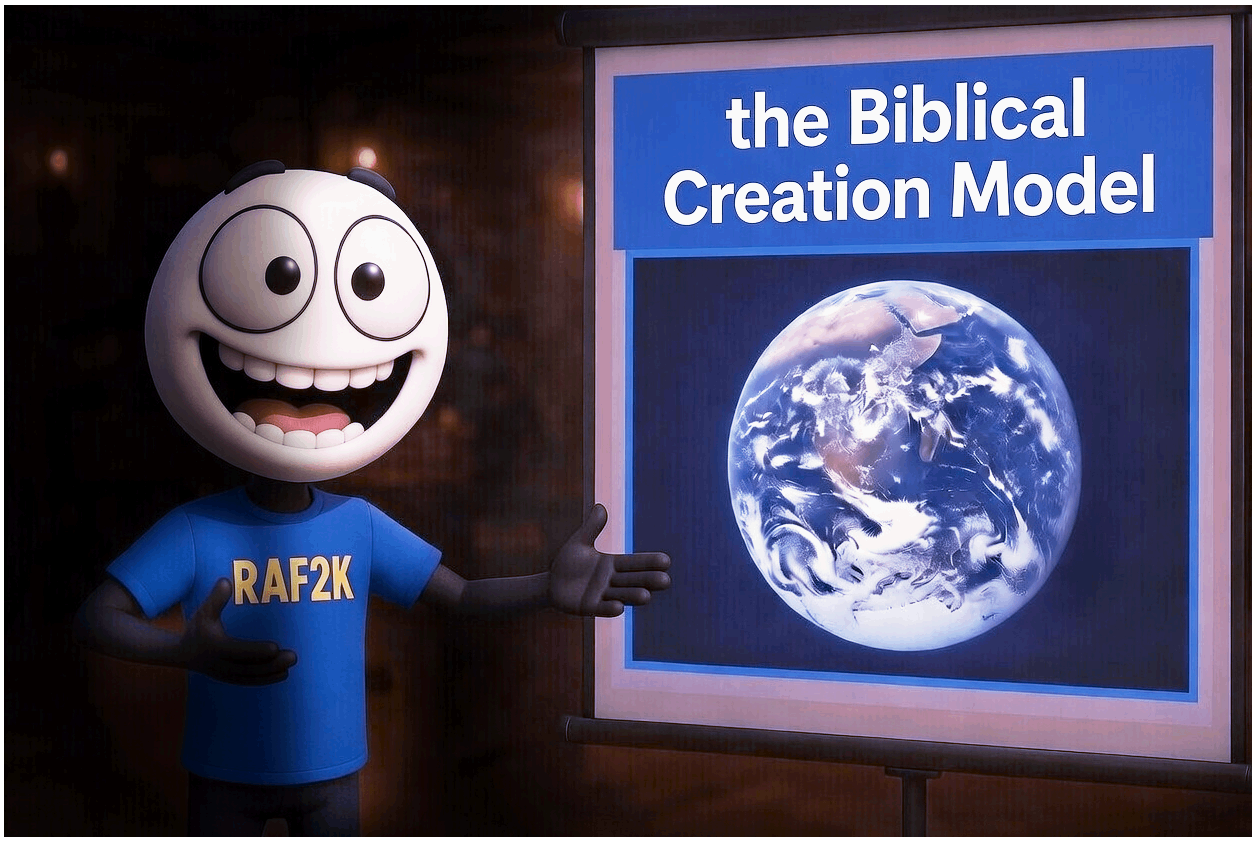
Finally, we looked at a textbook classic piece of support for evolutionary theory, **Homologous Features**. These are features believed to be shared by different species because that feature was passed down from a common evolutionary ancestor which had that feature. But again we learned the double edged sword which is evolution, as we saw that a common feature could not be called Homologous unless we already believed that the species in question had a common ancestor.



Thus, far from being evidence for evolution, we see that evolution and a particular evolutionary sequence must already be accepted before the common feature can even be called homologous.
Thus, at the end of the road we learn that the Evidence and Mechanisms of Darwinian evolution cannot cause evolution to happen. When properly understood, evolution is seen to be intellectually bankrupt- a collection of logical fallacies and wishful thinking. It has no observable evidence to support it, it must be used as evidence for itself, and regardless of whatever other beliefs you may have, evolution, when understood properly, fails on its own merits.
It is a tale told by an idiot, full of sound and fury, signifying nothing."
I was hoping for applause but got a couple of grunts of "Huh," and the sound of root beer being slurped. But then Blue Beard clapped. And then he clapped again.
And then Bill joined him in clapping. And then Tom did, but not with full enthusiasm. But that was ok.
And then Carl said, "Now can we pick apart his spelling and grammar?" But it was too late, for Wendy had arrived with our plate of Nachos. "Hold on," Carl said to her. "Before you put those Nachos down, I think I should point out that you haven't done anything to prove that God exists, let alone that he made the world in six days."
"I wasn't trying to," I said. "I was merely attempting to show that Darwinian Evolution fails on its own merits. You don't have to be a creationist or even a theist in order to see that evolution is false. You can reject it merely by understanding it properly, whereas Evolution is based on a foundation of rejecting the Bible as true history."
"I know it's been a long time," Bill added, "but the conversation wasn't about Creation versus Evolution. It was just about Evolution. Whether it's true or false."
"But since he's brought it up," said Tom, "I would like to hear a defense of the opposing side. We've looked at Evolution according to its merits. How about we do the same with Creation?"
"You guys can do what you like," said Wendy, "but I'm putting these Nachos down. They weigh a ton."
Standing on my toes to see over our Nacho dinner, I said to them, "Challenge accepted! On Thursday next, I shall have another Power Point Presentation of scientific education and clip art!" I took their munching on handfuls of Nacho to mean they were in agreement, and began making mental preparations. I do enjoy the study of Creation Science, or, as I call it, "Science." But I secretly was also excited to make another Power Point Slide Show.

Defining Evolution 20: The Case for Biblical Creation (A Chapter not Strictly Necessary)

You know what I love? Aside from Nachos, I mean. I love applying transitions and animations to PowerPoint Slide Shows. I had spent a Wednesday evening in my home office paradise, making a presentation that was truly boffo, and come the following day I was distracted all day by the thought of getting to present it to the lads down at Danny's Bar, Grill, and House of Rabbelrousing.



This week's presentation was a defense of **the Biblical Creation Model (*or as I like to call it, "What really happened*.**"). This part of my larger case was not, strictly speaking, actually necessary. The discussion which we had begun all those weeks ago was about the actuality of Darwinian Evolution. Carl had said Evolution was a fact, and I had said it was not. Since then we have been discussing the facts and I had concluded that Evolution fails on its own merits. One did not need to first accept Biblical creation to see that Darwinian Evolution did not happen. One only needed to understand Darwinian Evolution.

But my good friends Carl and Tom had asked me to present the case for Biblical Creation, and I was certainly happy to do so. Thus I had made a presentation for them, and for our friends Bill and Captain Blue Beard, to be presented this evening pre-Nachos. It was entitled, “In Defense of the Biblical Creation Model,” and subtitled, “What Really Happened.”

Once again our round table near the dart board in the back was adored with fresh, frosty root beers and as we began, I had surprised the boys with an order of Buffalo Wings.

“Who is ready for some science?” I asked, bringing up the title screen of my presentation.

“Boo!” shouted Carl. “Get off the stage!”

“Ya can’t heckle him yet,” Blue Beard scolded him. “He ain’t said nothin’ yet.”

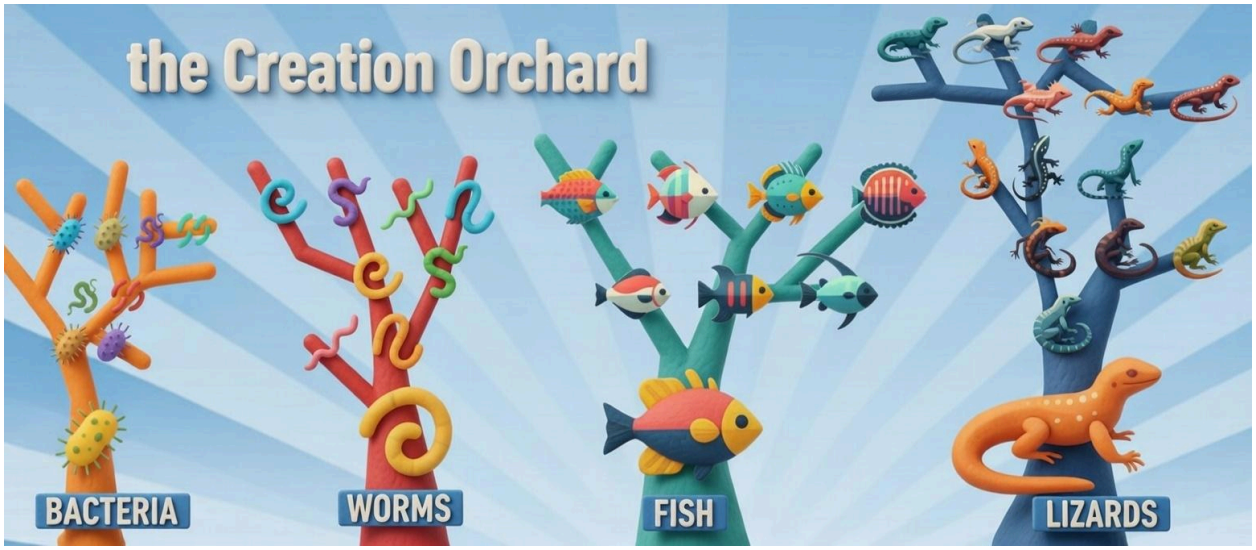
“I wanted to get it out early,” said Carl, “in case I had a mouthful of buffalo wing when the opportunity presented itself later.”

“Oh,” replied Blue Beard. “That actually sounds pretty logical and efficient.”

“Last week,” I began, undeterred, “I was asked to present the evidence for the Biblical Creation Model, or as I call it, “What really happened.” Today I shall do just that, keeping in mind that each of these topics could be its own week of discussion, or an hour-long lecture by a PhD in the field.”

“And for your brevity,” said Bill, “and for these Buffalo Wings, we thank you.”

“I shall start,” I said, “by contrasting the two models. We remember the Darwinian Tree of Life,” I said showing a familiar image on the screen. “Every living thing, according to it, can be traced back through common ancestors until the first common ancestor is reached, which is something like a bacteria. The Creation Model, on the other hand, is not a single tree but rather an orchard.



The evidence is rather simple. One of the problems with the Darwinian Tree of life is a lack of transitional forms. There is the limb representing the turtle kind, which branches off into the many varieties of turtle, and the limb representing the dog kind, branching off into the many varieties of dog, but there is no evidence for there ever having been a half dog, half turtle. Nothing connects those two limbs except wishful thinking and blind faith in evolution. This ***lack of transitions*** is on the list of Achilles' heels for Darwin, but is actually ***evidence for Creation***. For the model built on the Creation account in Genesis shows that the Turtle limb is not a limb, but a separate tree. Similarly, the dog limb is its own tree. Each **Kind** of animal is its own tree, thus the Orchard."

"I think you're forgetting," said Carl, "that the very definition of Special Creation is that God made all of the species. Everything that lives today was made that way by God according to your holy book, or are you letting science guide you away from the sacred texts?" He gave a buffalo covered smirk.

"As usual, our good friend Carl has brought up a good point which is rooted in a misunderstanding and the modern wave of illiteracy," I said.

"How do you mean?" Carl demanded.

"I mean," I replied, "that like many people, you think you know what the Bible says having not read it. It's not unlike the way a lot of people, having never read it, think Romeo and Juliet is a romantic comedy.

"The Bible does not say God made *the species*," I explained. "What the Bible says is that God created everything *according to its **KIND***. Although to be fair, the word *Species* did once refer to the created kinds, or, kinds *specially* created, which is the origin of the word. But in the 1700's the word started to be used in a different way among some, and so there became a confusion amongst lay persons. Prior to then, one would say there was one dog species, and one turtle species, because species meant ***the created kind***, but the more modern animal classification redefined *species* to mean variation within a kind, so some people did maintain the position of saying God created the species without realizing that the definition of that word had changed. Thus your confusion, Carl."

"Don't feel bad, Carl," said Blue Beard. "It's only been three hundred years. We don't expect you to get caught up that quickly." He smiled a sea-faring smile and washed down a chuckle with some root beer.

"So how do you define a kind?" asked Tom.

"A good question, Tom," I said. "Molecular Geneticist Dr. Georgia Purdom says that a kind "*represents the basic reproductive boundary of an organism. That is, the offspring of an organism is always the same kind as its parents, even though it may display considerable variation."*

"Consider the orchard. Each tree has a trunk, and all of the branches share core similarities with the trunk. All turtles have common, core turtle features. All bats have

common bat traits. The base of the tree- the trunk at the bottom- would be the created kind, and the branches would be the varieties which have diversified from that original gene pool."

"Sounds like descent with modification to me," said Carl smugly. "I suppose the variations which arise are weeded out through Natural Selection to create the species which are best fit to their environment, or as I like to call it, the Survival of the Fittest."

"Yes, that's right," I replied.

Carl nearly choked. "Did I hear you wrong? Or did you just define your Creation model as working along Evolutionary lines?"

"Apparently you did hear wrong, because I said nothing about Evolution," I said.

"I have to side with Carl," said Tom. "You did just call upon Descent with Modification, Natural Selection, and Survival of the Fittest. Those are all Darwinian ideas."

"Ah, but this is the very reason we had to define Evolution," I reminded them. "Because if you recall, none of those ideas are Evolution, even if they are used by Evolutionists, Darwin included.

"Descent with modification happens, as we know it did in the dogs, because of the *shuffling of existing genes* and the occasional *loss of genes* from a population. The next generation of dogs is a little different than the last, but not because genes have been added. Thus, new varieties are created, the dog tree grows some new branches, but no evolution has occurred because these changes cannot grow the Darwinian tree of life. These changes will never turn a fish into a lizard. They CAN grow a tree in the Creation Orchard, but they can never grow the Darwinian Tree of Life."

"Let me refresh yer memories," offered Blue Beard, pulling out a deck of cards.

"The deck has all of the cards in it. Fifty two cards. I shuffle and deal, and I get a hand of cards which was already in the deck. I can do this a million times or more and never get the same hand twice. I can also change the outcomes by leaving a card in the box, or hiding one up my sleeve. But while each successive hand is unique, and different

than the last, that's because the deck was full to start with, and because I shuffle each time I deal."

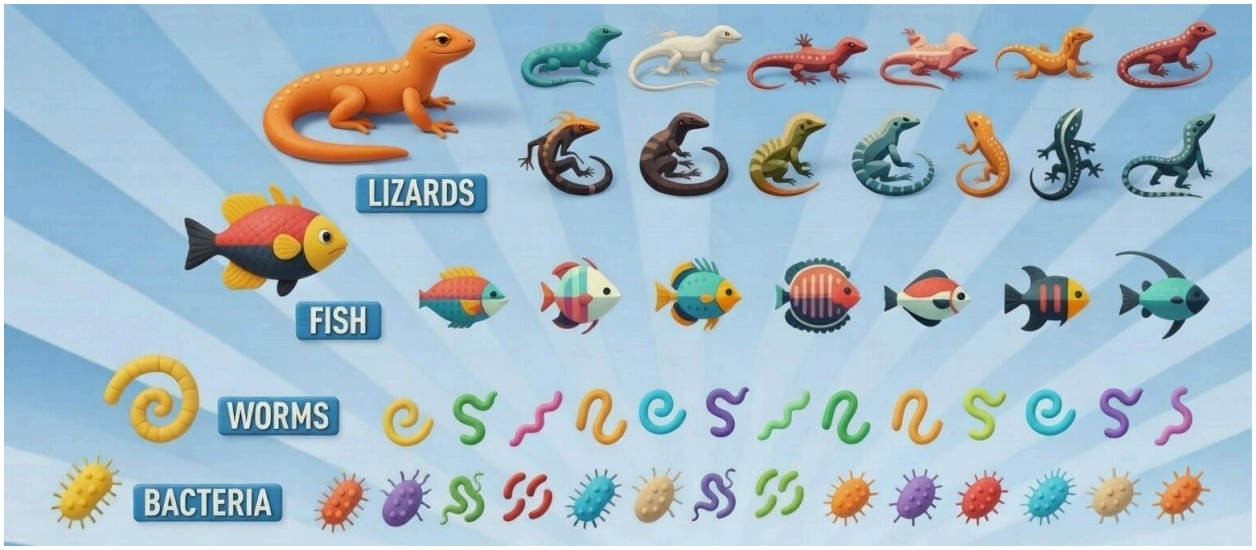
"So the model," Bill added, "would say that the genome of the created kinds were the full deck. They were made with a lot of variations in the original, parent population, and then those genes were shuffled in each following generation, and occasionally lost as time went on."

"Shuffling might get a rare hand, like all aces," said Blue Beard with a smile, "but it will never get you a hand with the Archduke of Hearts, because that card doesn't exist."

"So the full deck is the created kind," I said. "From that original parent kind comes all of the variations that exist. Descent with modification, but due to shuffling or gene loss, not due to new genes or new genetic information, which, I will remind us, we have never seen in nature."

"But you're still stealing Natural Selection right off the title page of Darwin's book!" Carl said accusingly.

"Actually," I replied, "Darwin stole the idea of Natural Selection from a Creation-minded Scientist named Edward Blythe, who had published on it several decades before Darwin's book would be published. He described it just as it is, and as Darwin eventually understood it, as an editor. Nature shuffles the deck but occasionally deals a bad hand - such as a cow with five legs. But because this hinders the cow's survival or chance of reproduction, the variation is selected out - the cow dies and fails to pass on this trait to offspring - and the species remains more like the created kind than different. Once again, Darwin eventually admitted that Natural Selection was an editor which removed harmful variations and preserved beneficial ones, but he also admitted clearly in writing that Natural Selection does not create any variations. It can only act on variations which already exist."



“So survival of the fittest,” said Tom, “just means that the beneficial variations survive, whereas individuals with harmful variations don’t.”
“That’s it exactly,” I said. “The genes in a created kind can create a huge range of variations in the population, both by shuffling and occasionally losing genes, such as we’ve done by breeding dogs. But we’ve made a lot of different dog variations which would never survive in the wild. In nature, those variations would be unfit to any environment, and would be removed by natural means because they are unfit. Those dogs which are more wolf-like would survive in some environments because they are more fit to survive.
“Again, it’s not evolution,” I explained. “It’s just the natural equivalent of market factors determining the success of sales for a particular product already developed. It doesn’t develop products, it just determines if they will continue to be produced. Good sales ensure more production of one product, and poor sales ensures a variation on the same product will stop being produced and will disappear.”
This was a language Tom understood, and he nodded in agreement.
“But that still leaves you with one big evolutionary idea in your model,” said Carl. “Common Ancestry.”
“Actually,” I replied, “that just leaves Evolution having stolen another idea from Biblical Creation. Common Ancestry is just that. Some members of a species came from common grandparents. You and I come from the same great great grandparents, if we go back far enough through our own family trees. Darwin would tell you that your great great great grandmother was a rock. Literally, a rock. But unlike Darwin, the Biblical model says kinds come from the same kind, which is what we always observe in nature. The common ancestor of all dogs is a dog. The common ancestor of all turtles is a turtle. Cabbages and broccoli and cauliflower and kale all have a common ancestor which is a plant, but cabbage and wolves do not have an ancestor in common. Everything reproduces according to its kind, just as Genesis says. We’ve never seen anything to the contrary. A litter of bunnies may look different than the parent bunnies, but they are still going to be bunnies, and not some kind of fish, or tomato.”
“So if I’m gathering all of the information,” said Tom, “you’d say the created kind is defined by having a genetically rich first ancestral pair or population, which had all of the genes that the members of the kind today still have, but the original collection of genes has been disseminated and sometimes lost due to Natural Selection.”
“Something like that,” I said. “Some will add that the created kind is either able or historically were able to reproduce with members of their own kind, even when not members of the same species as we tend to use that word today. Depending on how you define species.”
“How’s that?” asked Blue Beard. “You saying some members of a kind can’t reproduce with their own kind?”

“Consider dogs,” I said. “If you try to breed a Labrador and a Poodle, you can get a Labradoodle. But if you try to breed a Chihuahua with a Mastiff, you probably don’t get anything but a frustrated Chihuahua and an annoyed Mastiff. Those two varieties have lost too many genes or been shuffled too far to breed together, but they both come from past generations of dogs which would have been able to interbreed. So they still share common dog features, and can breed with other dogs, but not with each other. I know it's possible to breed a Chihuahua with a Beagle to get a… well, whatever you call that. Beaghuahua? Anyway, I suspect it is also possible to breed a Mastiff with a Beagle, or at least possible to breed a Mastiff with a dog that CAN breed with a Beagle. So, even if several varieties are separated, we can show that they are the same KIND because they can breed with other members of the same kind.

“We now know you can breed a camel and a llama to make a calamal, or a comma. This means that they are both descended from the same created kind. The same is true with lions and tigers, and with polar bears and black bears, and with zebras and horses and donkeys. Species we thought were absolutely distinct turned out to be variations on the same kind, absolutely capable of producing offspring together.

“On the other side, you will never successfully breed a camel with a tomato or a whale or a finch. Or to broaden it, you will be able to breed any two dogs either with each other, or with other dogs which can then breed with each other, but no variety of dog will ever be able to breed with any variety of turtle, moose, or tomato or cabbage.”

“So, would the created kinds for some animal groups be what we call the family, class, or order? Tom asked.

“In some cases, yes,” I answered, “but sometimes it’s not that clear. Rarely is it going to be anything we call a species, but again it depends on how you define species.”

My friends all acknowledged their understanding with the consumption of another buffalo wing, and so I continued.

“There is an important historical event which affects the Creation Model,” I said, “which is the flood of Noah. It happened about a thousand years after the creation. In the study of the created kinds, this is called a Genetic Bottleneck. What that means is, the variations which existed at the time of the flood had all of the genes of the created kinds, but only two of each kind were taken on the ark.”

“Hang on!” said Carl. “Are you trying to whittle down the guest list on the world’s oldest floating zoo by saying that Noah took two of every KIND and not SPECIES? Sounds like a convenient fix for a logistic problem in your Ark fable.”

“What does the Bible say, Carl?” I asked. “Does it say Noah took two of every species, two of every variety, or two of every kind?”

“It… well, I don’t know,” he admitted.

“It says **kind**,” I informed him. “But then again, when the Bible was first translated into English, no one distinguished between Species and Kind like we do today. So the four

hundred variations of dog we have today are the great grand puppies of possibly a single pair of dogs on the Ark. The fact is, none of today's dog varieties existed until AFTER the flood. You won't find Poodles in the fossils."

"So let me paint the picture thus far," said Blue Beard. "God creates the orchard in the first week, over a couple of days. The orchard - the full genetic deck - fans out into probably a wide variety of interesting critters, many of which are still preserved in fossils, but then the flood comes along, and so the trees each get pruned down to one pair per tree taking a year long non-pleasure cruise. Then, from them what's got on the Ark, the varieties of the kinds which we have today descended from those seafaring great grandparents. That sound about right?"

"Yes indeed, Blue Beard," I replied. "And I think you just discovered why you love the open waters. It's somewhere in the blood of all of our ancestors."

"It might also explain sea sickness in landlocked persons such as myself," added Bill.

"Now the key point here," I said, "is that the Genesis account calls for plants and animals ***reproducing according to their kinds***, and that is exactly what we observe. Evolution, on the other hand, demands that plants and animals give rise to different kinds. On Darwin, dogs came from non-dogs at some point in their past, and turtles came from non-turtles. But we never observe this, and have no evidence of it ever happening. Nothing spanning two kinds is found alive now or in any fossil ever discovered. So, in a nutshell, that is the Creation Orchard, and a basic summary of the Creation Model."

"Say, I just remembered something," said Blue Beard suddenly, rummaging through his coat pockets. "Speakin' of a summary of the Creation Model. When we was first talking about this, many Nachos ago, I had got us talking about what evolution was not. Here it is." He pulled out a small parchment and read part of it to us.

"Biblical Creation is, and evolution is not:

1. **Creation by an intelligent designer**
2. **A great deal of functional genetic information in the past gradually decaying over time into less functional genetic information.**
3. **A great deal of genetic information in the beginning of a kind being disseminated through subsequent generations so that genes are lost over time.**
4. **Animals reproducing only within the genetic boundaries of their kinds, and no kind ever giving rise to a different kind.**
5. **Animal kinds and even species remaining the same for very long periods of time.**
6. **Extinctions."**

"Hang on," interjected Carl "We already decided that extinctions aren't any more a part of the Creation story than it is the Evolution story."

“Oh, fair nuff,” replied Blue Beard. “I guess everyone’s got room for that in their story.”
“Let me take these from the bottom up,” I said, taking Blue Beard’s parchment. “Number five, **Animal kinds and even species remaining the same for very long periods of time.** This is just stasis, which we discussed when we talked about fossils. If you accept the evolutionary dates, you see animal and plant kinds staying the same for long periods of time. Of course, I don’t accept those dates, so there’s no long time, but there’s also no changing. In the fossils we find bats and turtles and dogs and camels and horseshoe crabs, and in nature today, we find all of those guys. And nowhere do we find any of them turning into something different. There’s no half crab, half tomato, or half dog half cabbage. Stasis is just plant and animal kinds reproducing according to their kind, just like Genesis says.”
“And number four,” said Bill, “**Animals reproducing only within the genetic boundaries of their kinds, and no kind ever giving rise to a different kind**, is just a restating of that idea again. Plant and animal kinds reproducing according to their kind. It’s the old testament non-evolution clause.”
“Number three,” I continued, “**A great deal of genetic information in the beginning of a kind being disseminated through subsequent generations so that genes are lost over time**, is just a genetic description of the orchard. The base of each tree, for example, the created dog kind, had a perfect genome with a lot of variation built into it. The dogs of today, while very wide in variations, are the results of the genes being shuffled and lost.
“Number two, **A great deal of functional genetic information in the past gradually decaying over time into less functional genetic information**, kind of piggybacks on three, because it explains how mutations can cause the break down of existing genes, which logically means the genes were more perfect in the past and are getting worse over time. This fits perfectly with the observation of genetic entropy. Once again, while evolution says DNA accidentally wrote itself, and then gained new genes by misspellings, Creation says God designed living things and wrote the DNA code, and since the fall the code has been breaking down. It makes a lot more sense and fits what we have been learning in genetics for fifty years. Mutations always cause disease or death, but they never create new features and behaviors which are beneficial to its offspring as evolution demands must happen with regularity for all of the history of life on earth.
“And of course, number one, **an intelligence is the only possible cause of information and irreducibly complex chemical and mechanical systems**. Every living cell is a system of information and machines more complex than the StarShip Enterprise, so there is no logical alternative to intelligent design.”
“So you’ve got a model,” said Carl. “So do the Flat Earthers. What does it prove?”

“Well, consider the model and known and observed data thus far,” I said. “The model calls for evidence of intelligent design, and every cell and every genome has that by the boatload.

“The model calls for plants and animals to reproduce according to their kinds, and this is all we’ve ever seen, and there is no evidence from the lab or fossils which would suggest anything different is even possible. Genetic entropy points toward a more complete and perfect genome in the past, just as Creation would imply, and regardless of your view on the age of the earth, all we see in the fossil record is stasis- meaning animal and plant kinds showing up fully formed and staying the kind they are for as long as they were on earth. So far I’d say we’re doing fairly well.”

“But what about all of them mechanisms of evolution,” said Blue Beard. “Whats any of them got to do with it?”

“Ah, yes,” I said, locating my next slide in the presentation. “I figured we could go through those and separate fact from fiction in light of the Creation model.

First of course was **Natural Selection**, and as we said, it works as an editor to keep the kind fairly consistent while allowing the great diversity in the genome to be expressed. No new genes are made, no evolution occurring, but it shows nature working to keep the created kinds themselves. No two headed turtles or five legged cows becoming the norm anywhere.

“Then there was **genetic drift/migration**. All this means is that animals and plants can be found in different places over time. It's such a non issue that I can’t believe that we’re even talking about it. In short, it doesn’t prove much when it comes to the Creation model, except to validate the idea that animals could hop off of Noah’s boat and travel all over the earth, adapting to their new environments due to their diversity in their genome.”

“You mean they evolve to fit their environment!” interjected Carl.

“No,” I replied. “I mean they already had enough diversity in their genes and in their populations that, in any environment, some were able to survive. But of course, over time this means that the populations in the frozen tundra start to look a lot different than the populations in the sub Sahara, even if we’re just talking dogs. This is what we call “Speciation,” meaning that a unique variation becomes different from and geographically isolated from members of the same kind who are adapted to a different environment. Evolution can’t help in cases like this because, evolution allegedly takes many generations to create new genes, yet if the present population can’t survive the summer and the winter, the whole species goes extinct. Thus, a dense genome at the start makes sense of what we see happening far more than the hope that evolution will come through at the last second.

“**Descent with modification-** we acknowledged this doesn’t mean a whole lot, and can be a phrase easily applied to the kinds which diversify as they adapt, like they had to after the flood.

“We took a look at **vestigial organs and structures**, but of course those imply a greater amount of structure and genetic information in the past, which goes right along with Creation and very much opposed to Evolution. This idea intends to show the loss of things which used to exist, not the creation of new structures that didn’t previously exist as Evolution would require.

“**Mutations** are almost always harmful, and even those which are not can add up over generations to cause disease or death. This tells us that they are the corruption of existing information and never the creation of new information- existing genes breaking down over time, not new genes coming into being. But of course that still points toward a perfect genome for every kind in the past gradually decaying through mutations over time, something that demands an intelligent designer with goals.

“**Fossils** are great evidence for the global flood, the vast majority being found in rock layers laid down by water all over the earth. First, the fossils as we actually find them are random and not found in the evolutionary sequence, often having land and sea creatures combined. But even more so, the vast majority of fossils found anywhere are marine invertebrates, like clams, even fossils found at the top of mountains. This supports the idea that the entire earth was covered with ocean in the past. Whole herds of dinosaur and whole pods of whales have been found buried quickly together. And while we find some species or variations in the fossils which no longer exist, we still find the kinds clearly distinct, and almost all of them the same as they are today, save a few minor variations. There are no transitional forms, even though Evolution would insist that billions of them would have existed.

“We saw that **molecular clocks** were unreliable at best, but have been used to prove that the human race had a female ancestor in common about six thousand years ago. So if you accept molecular clocks, you have evidence for Adam and Eve, about six thousand years ago. If you don’t accept molecular clocks, I don’t really blame you.

“And finally**, homologous features** show common design, which we would expect if the designer was a brilliant engineer. He made use of the best solutions for each kind depending on their needs, and sometimes used similar design or similar code, just as automotive designers or computer programmers do today. But then, we also concluded that we could not call two features homologous unless a certain evolutionary tree was accepted first. The only observable fact here is similar design, which, as I have said, easily implies a common designer. The alternative is, once again, evolution is used as evidence for evolution, which is meaningless circular reasoning and should never be mistaken for science.

“In conclusion, Creation fits the facts, and Evolution is the Faith the Facts have Failed.”

A smattering of applause from my friends told me that the buffalo wings were almost gone. But I had one more segment of my presentation to share.

“The last topic I wish to address, which is not strictly necessary to the topic, is why all of this matters. Why does someone like me even bother to learn about the science behind Creation instead of taking the easy way out and doing what so many have done in America since the 60’s blinded us with drugs and bad music and merely say, “OK, evolution is a fact, but God did it and that was what Genesis chapter one really means anyway.”? The simple answer is: The Gospel.

“While many people have been able to staple Genesis and Darwinian evolution together like stapling a frog to a chicken’s backside, far more have found that solution unbelievable, and have decided that they will reject the Bible for what they believe to be science. The statistics are bleak gentlemen. Around 60% of the kids growing up in church youth groups are going to leave the church in college, never to return. They are fed this deep time, Big Bang, evolution drivel and, because their college professors tell them it is scientific fact, they reject the Bible from cover to cover in one unfortunate and ill advised swoop. But this means they have distanced themselves from God, and thus are lost in their sins.

“See, everyone knows the bad news. We are all sinners, or, as we like to excuse it, *“Nobody’s perfect.”* But the truth is, our sins don’t fade over time, even if the memory of them does. We need the debt of our sins to be paid, but we can’t pay it.

“But God so loved the world that he sent his only son, that whoever believes in him shall not perish, but have eternal life. Jesus paid the debt we owed by giving himself as the atoning sacrifice for our sins, so that God could justly forgive us and adopt us as sons and daughters.

“That’s the gospel, the good news. We are saved from our sins and the judgment to come through putting our trust in Jesus. But when people are taught to reject the Bible, when they are told it’s been proven wrong, they reject salvation and remain enemies of God.

“This is why this conversation is worth having. We are not the result of blind, random, accidental processes over millions of years. If I may be so bold as to quote a famous story telling tomato, ***“God made you special, and he loves you very much.”***

It was only moments before Wendy arrived with our weekly tour de Nacho, but I think we all had a lot to think about in addition to having lots to consume. Soon our talk wandered off onto other things, but what is more important to you than what we talked about next, is what you will do next.

You have heard the case. You have been given the facts. Will you follow the evidence where it leads? Will you acknowledge the work of our loving God, Creator of heaven and earth? Will you learn to see yourself as the purposeful work of a great artist, a

person wonderfully made in the image of God? And most importantly, will you accept the free gift of Salvation through Jesus Christ?
I hope you do.

Thanks for letting me be your Rent-A-Friend, and happy Nachos!