

**The  
Mighty  
*Gekkota***

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“Reptiles and amphibians are sometimes thought of as primitive, dull, and dimwitted. In fact, of course, they can be lethally fast, spectacularly beautiful, surprisingly affectionate and very sophisticated.”<sup>1</sup>

-Sir David Attenborough

When many of us think ‘Ancient’ or ‘Primordial’, our imagination conjures up images of ruins and colossal bones found in the Earth. Things long buried have often fascinated and intrigued us with long faded power. Usually grand, in scope and proportions, to the extent of being majestic. Point and case going to the one and only Tyrant Lizard King (*Tyrannosaurus rex*)<sup>2</sup> Though, *T.rex* is not the only incredible reptile to inhabit the past. All modern species of reptiles, as we know them, diverged from those that evolved into dinosaurs long ago. About 150 million years, give or take a millenia. Reptiles during this era were so incredibly diverse that they dominated almost every terrestrial ecosystem, as well as many semi-aquatic, and fully aquatic ones. One infraorder (a fancy science word for ‘this particular group of biologically similar species’) of reptiles, *Gekkota*, was discovered to have lived 100 million years ago. And by lived, I mean they had at this point already evolved the traits that make them so incredible today. Their biology back then was essentially the same it is now. (Sorry for the interruption, but here is a great, easily readable article about ancient geckos, and other species, found in amber, just like in *Jurassic Park*<sup>3</sup>. Actual source<sup>4</sup>.). To put these facts into perspective, mammals that lived back then were basically furry lizards that were about the size as modern day hamsters. Speaking of cute animals, geckos are widely known to be some of the cutest reptiles. Their general appearance and demeanor make many of our hearts go “SQUEEE, TOO CUTE!”. But, there is actually a great advantage to these “cute” features, which I shall elaborate on, though a bit later in this essay. This horribly self-aware essay. Firstly, though, we need to look at how, when, and why *Gekkota* became a successful group of reptiles. You will truly appreciate how awesome they are.

Let us take a step back and briefly look at the history of life on land. But using only a few numbers! I love numbers, but know that some of you do not. We will deal in the conceptual and I will provide you with links to explore deeper on your own, as this is

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<sup>1</sup> <https://www.imdb.com/title/tt1181716/>

<sup>2</sup> <https://en.wikipedia.org/wiki/Tyrannosaurus>

<sup>3</sup>

<https://www.newscientist.com/article/2079606-dinosaur-era-geckos-and-chameleons-perfectly-preserved-in-amber/>

<sup>4</sup> <https://advances.sciencemag.org/content/2/3/e1501080>

not meant to be a paper or thesis, but merely an essay to express how much I love reptiles. *Gekkota* is just one group that I adore. One of the earliest known life forms that paved the way for reptile-kind was the genus *Hylonomus*<sup>5</sup>, which appeared about 300 million years ago. It looked much like many modern lizards do today, and acted very much the same. Essentially, eating bugs and basking on rocks. What this meant, is that these ancestors of many modern day geckos were one of the groups that established a niche for those that followed. Think of it like rich, successful parents making the lives of their children easier by getting them the best education and food.

*Hylonomus*, and many other reptiles(as well as reptile-like tetrapods, though that is a tangent for another day...) were great at many things and had many features that helped them thrive. One of these traits is their size. *Hylonomus*, like many living geckos, was relatively small. About 20 centimetres, or a bit under 1 foot. This allowed them to escape large predators by diving under logs or crawling into cracks of fissured stones. Another trait that aided them were their jaws and teeth. Which were designed to grab, and hold onto, small prey. Many bugs are quite agile, and hard to catch, so when you do actually get one, you want to make sure that you can hold onto that meal, lest it escape and you starve. With the ability to quickly close their minute jaws, they use spike-like teeth as if they were cute, little bear traps. You may find insects detestable, and many would rather eat their own shoes than a cricket, beetle, or any form of larva. But many insects are high in protein, and other vital nutrients, in proportion to their weight. Also, minimal negative fats<sup>6</sup>. The only real downside to eating insects is that their exoskeleton is made from keratin, which simply does not break down very well once ingested. Though, since *Hylonomus*, *Gekkota*, and other reptilian insectivores were much bigger than their prey, this amount of keratin rarely did any harm.

This source of nutrient rich food was perfect for ancient reptiles, and allowed them to thrive. Though, there was much competition for this bountiful food source, which forced different groups of reptiles to seek different hunting methods and different insect prey. Now, this certainly is not the only factor that contributes to geckos evolving their unique traits, but it is certainly an important one. 100 million years ago, geckos already had some amazing features to help them do this, primarily their specialized toe pads that allow them to climb a tremendous variety of surfaces, both natural and man-made. These incredible feet not only allowed geckos to reach food sources unavailable to ground-locked competitors, but allowed them to escape being eaten themselves in the same manner; by climbing! Being small and lightweight allowed them to climb with little effort and their eyes granted them the ability to see and track

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<sup>5</sup> <https://en.wikipedia.org/wiki/Hylonomus>

<sup>6</sup> <https://www.medicalnewstoday.com/articles/311139>

prey at angles and perspectives that would make most people disoriented. Next, we'll explore how this led to great success for the geckoes.

This is what is referred to as 'finding a niche'. That is to say, occupying a specific role in the ecosystem. Geckos found their niche a while ago, and are happily doing the same things today that their ancestors did millions of years ago. They are a group of animals that have found a solid foothold in the natural ecosystem, not unlike crocodilians and sharks, which have also remained mostly unchanged for many eras. Becoming specialized enough to take advantage of your surroundings, yet adaptable enough to survive a diverse influx of threats and changes to the world. That is the pinnacle of evolution. The very zenith of the right to walk this planet. Don't get me wrong, I would have LOVED it if dinosaurs had survived, and somehow allowed humanity to evolve the way that it has. But they died out because they couldn't cope. Life on this planet is brutal and unforgiving, only the toughest make it. The next time you are in a pet store and see a gecko, look into that little fellow's eyes and know that their kin survived a natural calamity that decimated the likes of prehistoric titans.

But the infraorder *Gekkota* did not simply survive. They thrived! They were so widespread that by the time the New World separated from the Old World, they had already reached every continent. Well, except Antarctica.<sup>7</sup>(If you don't look at any other link/reference in this essay, please at least look at this one! #7 leads to a site meant for kids, but has some incredible photos of geckos from around the world, gives you tidbits of information, and has a world map that shows how widespread geckos are across the world!) They also diversified enough to inhabit a large variety of ecosystems. From tropical rainforests, to deserts, to urban environments, you will find geckos damn near everywhere. Two reasons that illustrate how prepared *Gekkota* are to kick ass and take names are these: Insects are almost everywhere and climbing is useful in almost every environment. This is pretty much all geckos needed to explode into over 600 different species, with more constantly being described and discovered.<sup>8</sup>

I already explained about how great it is to eat bugs, so let us take a look at the second reason. Geckos can climb better than any vertebrate. They do not need foot or toe holds. They do not need anything to rest on or push off. All they need are their magical little toe pads and a small amount of limb strength to carry their minute bodies. But these toe pads are not suction cups like that of a squid, or the claws of other vertically inclined reptiles. Geckos flat-out abuse principles known as the Van der Waals forces. These forces, by definition, just sound like science fiction.<sup>9</sup> To put it simply, geckos use electro-magnetism to cling to surfaces. Not unlike how static

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<sup>7</sup> <https://kids.nationalgeographic.com/animals/reptiles/gecko/#/gecko-on-leaf.jpg>

<sup>8</sup> <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3075428/>

<sup>9</sup> [https://www.lexico.com/definition/van\\_der\\_waals\\_forces](https://www.lexico.com/definition/van_der_waals_forces)

electricity sometimes causes fabrics to stick to one another. The toe pads of a gecko are actually very, VERY complex. The surface of each pad is covered in tiny scales, that split into even tinier scales, that eventually split into incredibly small, feather-shaped scales. This allows for the maximum amount of surface area to make contact with any given surface. Which, in turn, means more room for electrical build-up. Think of any surface as positively charged and a gecko's toes as negatively charged. Opposites attract, via magnetism! Kind of like cute, little Magnetos.<sup>10</sup> With insane skills like these, it may be hard for some to relate or empathize with these adorable lizards. As humans, our state of mind when encountering new things can sometimes be tinged with the notion of 'different is bad'. But geckoes are actually not that different from mammals. Or humans, for that matter.

Reptiles(Class *Reptilia*) and mammals(Class *Mammalia*) both reside within the kingdom of *Animalia*, the phylum *Chordata*<sup>11</sup>, and the subphylum *Vertebrata*. "What the fuck does any of that mean?" You ask? Great question. Here is a list of things that are present in the biology of both reptiles and mammals(as well as all other classes within kingdom *Animalia*, like birds, fish, and even insects!): Consume organic material, breath oxygen, are able to move, and reproduce sexually. That one was pretty straight forward, but the next one is not. For me to properly explain what a *Chordate* is to someone with little-to-no knowledge of neurology, biology, or related fields, I would have to expend a lot of words and would end up using enough brain and nervous system terminology to warrant adding a glossary. So, I will improperly explain the nature of *Chordates*. Beings of the phylum *Chordata* are organisms that, will have, have, or had, a few specific types of nerves(chords<sup>12</sup> and cords<sup>13</sup>). In addition, they also have a couple of odd ways of consuming nutrients, during at least one stage in their lives. Like gill slits<sup>14</sup> and a mucus vacuum<sup>15</sup>. Finally, the fifth quality that defines an organism as a *Chordate* is possession of a tail, even if temporarily. You, yes you, at some point in your life had gill slits, a built-in mucus vacuum, and an actual, tangible, tail. And so do, or did, many geckoes. But most humans lose these fascinating traits sometime before even being born. Although, I admit, I have unfortunately met some vacuumous and bile-inducing humans during my 2.8 decades on this planet. The last one is as easy as the first. Every member of the subphylum *Vertebrata*, has a vertebral column. A spine! With so many similarities, how can you not want to call these small and friendly little climbers your distant

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<sup>10</sup> [https://en.wikipedia.org/wiki/Magneto\\_\(Marvel\\_Comics\)](https://en.wikipedia.org/wiki/Magneto_(Marvel_Comics))

<sup>11</sup> <https://en.wikipedia.org/wiki/Chordate>

<sup>12</sup> <https://en.wikipedia.org/wiki/Notochord>

<sup>13</sup> [https://en.wikipedia.org/wiki/Dorsal\\_nerve\\_cord](https://en.wikipedia.org/wiki/Dorsal_nerve_cord)

<sup>14</sup> [https://en.wikipedia.org/wiki/Pharyngeal\\_slit](https://en.wikipedia.org/wiki/Pharyngeal_slit)

<sup>15</sup> <https://en.wikipedia.org/wiki/Endostyle>

cousins? They are awfully cute! Though, some do not quite get why this is. What makes a gecko cute?

The same thing that makes kittens, puppies, and babies cute. Proportions and behaviour. The feature that screams 'Cute!' the loudest are big eyes. Big eyes in proportion to a relatively small face. Humans, particularly female humans, (not being sexist, see #16!) are programmed to identify cuteness like a guided missile<sup>16</sup>. This is undoubtedly an evolutionary advantage that helps parents subconsciously become better at caring for their children. In addition, having a large head (specifically a longer forehead and wider cheeks), also increases the 'Cute!' factor, apparently. Geckoes have these traits in spades. In terms of behaviour, anything non-threatening can be considered likeable. Though, a certain type of locomotion invokes thoughts of innocence. Small, quadrupedal(four-legged) animals sometimes move in the same manner as human babies. They travel the world with four limbs, close to the ground. Or almost any other surface, in the case of the geckoes.

Similarities to humans and aesthetic appeal are not the only reasons, or even the best reasons, to appreciate geckoes. There are many accounts of geckoes of various kinds, from all over the world, infiltrating peoples' homes. They undeniably do so for their own benefits, but it leads to a positive result for the humans involved. For the geckoes main source of food, and the reason for their intrusion, are insects and other small invertebrates. Even the common ones that are really annoying to deal with, like cockroaches, spiders, flies and more. Geckoes, in many parts of the world, are free pest control. I found many different articles, particularly about asian house geckoes(*Hemidactylus platyurus*<sup>17</sup>), that confirms this notion<sup>18</sup>. After that, I do not think that I need to explain why having geckoes around is a good thing.

From the prehistoric era, to this one, *Gekkota* has undeniably proven themselves as more than just low-tier lizards. They are survivors and thrivers. A group that has remained mostly unchanged for millions of years, because they simply had an amazing biological plan from early on in their ancestry. They have spread and diversified to dwell in different kinds of ecosystems, but many of their core survival strategies and biology remain the same. Not only have they climbed to the apex of their weight-class in the food chain, but they have done so while being absolutely adorable! As someone who has

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<https://www.dailymail.co.uk/sciencetech/article-1125762/Womens-hormones-help-pick-cute-babies--men-just-think-look-same.html#:~:text=Women's%20hormones%20help%20them%20pick%20out%20cute%20babies....they%20all%20look%20the%20same&text=Women%20are%20more%20likely%20to.their%20hormones%2C%20scientists%20said%20today.&text=The%20researchers%20say%20'cuteness%20sensitivity.influenced%20by%20female%20reproductive%20hormones.> (For fuck sake, there goes my paragraph space...)

<sup>17</sup> [https://en.wikipedia.org/wiki/Flat-tailed\\_house\\_gecko](https://en.wikipedia.org/wiki/Flat-tailed_house_gecko)

<sup>18</sup> <https://www.sunshinecoastdaily.com.au/news/to-rid-homes-of-insects-a-geckos-greed-is-good/813082/>

worked with many individuals of many different species of gecko, I can vouch for them from a personal standpoint as well. Their history and biology are incredible, but nothing speaks of how amazing they are like having one of these little lizards slowly clamber up your arm, chest, back, neck, and sometimes face. The tickle of their electromancing feet, their sweet little chirps and squeaks, and the expression in their huge eyes as they look into yours...are truly magical experiences. Remember that every gecko that you encounter is your neighbour, friend, and ally. One whose kind will likely live on long after humanity. Just as they outlived the dinosaurs and countless other species that were not mighty enough to withstand the test of time.