The Idea of an Essay

Volume 2 *Genres, Genders, and Giraffes* Article 13

September 2015

Reaching for the Right Answer

Hannah Gaitan
Cedarville University, hannahgaitan@cedarville.edu

"Reaching for the Right Answer " by Hannah Gaitan

Instructor's Notes

When writing an argument, students often believe contention or even aggression are required, but good rhetorical strategy requires the opposite. It requires knowing exactly who one's audience is and discerning ways to create unity with the audience, fostering respect, before accentuating differences. Aristotle identified this as an art – the art of persuasion – to be practiced and finessed, as opposed to verbal mud slinging. In this very well written argument, who do you think Hannah Gaitan's audience is? What strategies does she use to create unity and show respect for her audience. Can you point to specific word choices that achieve artful persuasion?

Writer's Biography

Hannah Gaitan is a second-year Pre-veterinary Medicine major from Boulder, Colorado. Hannah enjoys scientific writing, specifically dealing with animals, but finds creative writing and poetry to be difficult. She spends most of her time, however, studying for her classes and gaining hands on experience in the field of veterinary medicine. Her hobbies include equestrian sports, running, and hiking. She also enjoys hanging out with her family, boyfriend, and black lab, Buddy.

Reaching for the Right Answer

Introduction

Leaning up against the fence, smelling the fresh alfalfa, and listening to the soothing sound of the animals munching are the childhood memories I cherish the most. Ever since I was a child, I have loved to go to the zoo. To this day, I still sit and marvel at the beautiful creatures. Because of my deep love and passion for animals, I am working on a Biology degree at Cedarville University with an emphasis on Pre-Veterinarian medicine. Not only do I have a deep passion for animals, but I am fascinated by the science behind

them. They each have their own unique traits and features working perfectly together to enable them to do magnificent things. Although I love to study and learn about all animals, the particular animal that strikes my interest is the giraffe. The giraffe towers over all the other mammals on earth. Because of its long neck and tall legs, the giraffe's heart must be extremely strong in order to pump the blood up the carotid artery (the artery that carries blood to the head) and to the giraffe's brain, supplying it with oxygen and nutrients (Zhang, 2006). Since the giraffe's head is so far away from its heart, the giraffe has hypertension, commonly known as high blood pressure. As a result of this hypertension, the giraffe contains many unique mechanisms that counteract the high blood pressure and keep the giant beast alive (Zhang, 2006). For example, the rete mirable, or "marvelous net," is a spongy mass of blood vessels located under the base of the brain that stretches gently to decrease the powerful force of the blood entering the brain (Pittman, 2011). This is just one of the mechanisms the giraffe possess and relies on for survival. As one may notice about the giraffe, it is not like any other mammal on this earth. Because of the giraffe's unique long neck and legs, scientists, through the years, have continually debated on how the giraffe obtained these features. There are generally two distinctive sides to this argument, Evolution and Creation. The people who support the Evolution theory are generally called Evolutionists. They are usually atheists, people who do not believe in a higher being. Evolutionists believe in Evolution, which is the change in inherited characteristics, enhancing the organism and making it more complex over an extensive period of time. The opposing side is Creationism which is usually argued by people termed Creationists. This group of people is frequently religious and believes in a god or designer. Creationists believe that a higher power, God, created organisms out of nothing and designed them with a purpose. Many Evolutionists and Creationists argue over the origin of the long neck of the giraffe. Evolutionists believe the giraffe's neck started out short and slowly evolved into the neck it is today. However, Creationists believe the giraffe's neck was made with a specific, intelligent design in mind and was created the same length as it is today. In this paper, I will explain both theories; however, the giraffe's neck was created long due to the evidence shown in the fossil record, the essential mechanisms in place because of high blood pressure, and the

birthing process of a baby giraffe.

The Evolutionist's Theory

The giraffe (Giraffa camelopardalis) did not originally possess a long neck. Evolutionists believe the giraffe developed its long neck over an extensive period of time, about 50 million years. According to Evolutionists, the giraffe's neck evolved as a result of one or two possibilities (Simons & Altwegg, 2010). The first hypothesis is that the giraffe's neck evolved in order for the early giraffe species to compete against other browsers. This hypothesis was first presented in The Descent of Man and Selection in Relation to Sex, written by Darwin in 1871 (Simmons & Altwegg, 2010). Evolution of the short neck into a long neck would benefit the giraffe and allow it to graze for foliage which competitors could not reach ("competing browsers hypothesis") (Simons & Altwegg, 2010).

The second hypothesis is the "necks-for-sex" hypothesis. According to Simons and Altwegg (2010) the giraffe's neck evolved "for direct use in intra-sexual combat" in order to gain a mate. Evolutionists believe the giraffe's short neck gradually evolved into a longer neck through the process of a certain genes being passed down to the offspring. According to Simmons and Altwegg (2010) who cite Pratt and Anderson (1985), Brand (2007), and Darwin (1871) there are many lines of evidence which support the "necks for sex" hypothesis. First, the males with the longer and larger necks are the males which have the greatest chance of winning a female. Second, the female giraffes prefer males with larger necks. Third, "sexual traits are usually positively allometric [relative growth of a part (the neck) in relation to an entire organism (the giraffe)] (Simmons & Altwegg, 2010). Since the long neck is viewed as a sexual trait, males which successfully breed with the females due to their longer necks will pass this trait along from generation to generation over millions of years, thus resulting in a giraffe with a long neck. These two hypotheses both explain why the giraffe's neck evolved from a short to long.

Evolutionists admit to some problems with their hypotheses. According to Simons and Altwegg (2010), studies made by Simons & Scheepers (1996) "[were] found to [have] inconsistent support from foraging studies" (p. 7). Recent studies by Shorrocks in 2009 showed the giraffe frequently grazed at shoulder length and below

during the winter when the food would be most scarce. Simons & Scheepers cited Young and Isbell (1991) who researched and found that giraffes actually feed quicker at shoulder level. South African giraffes, however, were found to graze more often on plants higher then shoulder level (Simmons & Altwegg, 2010). It was determined these giraffes grazed at higher levels because the proper forage was located higher during the winter months (Simmons & Altwegg, 2010). The first hypothesis is threatened by one result and supported by another.

According to Simmons and Atlwegg (2010), "The sexual selection hypothesis predicts neutral selection on females and positive selection on males" (p. 7). This is one of the challenges the second hypothesis faces. The problem Evolutionists admit to is that natural selection should affect both genders, but sexual selection only accounts for the males' long necks. Simmons and Altwegg (2010) state that there is a need to explain "why female giraffes also have long necks" (p. 11). These are the two hypotheses Evolutionists present in order to explain the giraffe's long neck.

The Creationist's Theory

Creation argument is the counter argument to the Evolution argument. According to Dr. Elizabeth Mitchell (2013), who has studied chemistry and practiced medicine, "Biblical history informs us that God created all kinds of land animals on the 6th day of Creation week about 6,000 years ago" (p. 1). This is the basis for the Creationists' theory. God, the designer of all, created life about 6,000 years ago versus 12-15 million years ago. These land animals mentioned would include the giraffe. Creationists also believe that creation and science are complementary ideas. This view is portrayed by Dr. John N. Moore (2008), a Professor Emeritus of Natural Sciences at Michigan State University, who says "…the science and research practices of both creationists and evolutionists involve the very same techniques, equipment, etc…. As a consequence, I avoid the expression "creation science." I prefer the use of a hyphen—i.e., "creation-science"; the hyphen conveys that two areas of human knowledge have been joined" (p. 1). Creationists trust that science and their beliefs are coherent. They use science, just like the Evolutionist, in order to support their theory. Creationists believe that the giraffe's neck was created by

a designer with a specific purpose in mind. According to David Pittman (2011) who wrote the article "Walking Tall by Design," "… the idea that the neck became elongated stepwise over successive generations under environmental/selection pressures is now shown to be a great deal more complex than previously thought, with a whole assortment of structures and systems that need to be in place to accommodate the long neck….It illustrates the point that an organism is a finely balanced collection of interconnected (and often interdependent), systems. And the only One who can achieve such a delicate balancing act is the creative Genius who designed it in the first place" (p. 2). The Creationists believes the complex science behind the giraffe supports their theory which states that God created the giraffe on day six about 6,000 years ago. The giraffe appeared on this earth as one sees it today, and its long neck and legs remain unchanged, making the giraffe perfect for its environment. Unlike the Evolutionist's view that focuses more on the hypotheses rather than the evidence that supports them, the Creationist's does not require any additional hypothesis but focuses mostly on the research found. The scientific research supporting their theory revolves around the fossil record, the complexity and importance of co-dependent mechanisms in the giraffe, and the essential method of the birthing process.

The Rebuttal

The Fossil Record

The evidence found in the fossil record supports the theory which states: the giraffe's neck did not evolve but was created long, as one sees it today. Dr. Robert E. Simmons (2009), a behavioral ecologist specializing in the ecology of giraffes, believes in the Evolutionist view that the giraffe's neck evolved into a more complex and better-designed neck over time. In his scholarly article, he uses the fossil record to support his hypothesis. According to Simmons and Altwegg (2010) citing Mitchell and Skinner (2003), and Badlangana et al. (2009), "The earliest fossil ancestor of the giraffe…had skeletally short legs and neck, and occurred in India 12-15 million years ago. The giraffid [(an ancestor to the giraffe)], similar in size to the okapi showed long legs but an unelongated neck and arose about 12- 15 million years ago and went extinct about 9 million years ago. The medium sized Paleotragus germaini

and the large Samotherium sp. exhibited elongated necks relative to their total vertebral column" (p. 9). Initially, this seems like logical evidence which supports the Evolutionists argument; however, there are a few problems that arise from this statement. The two fossils found exhibiting the giraffe could have very well been other cloven-hoofed animal species with short necks such as cattle or deer. In fact, Evolutionists claim the two fossils of the giraffe containing a short neck and short legs both lived on the earth at the same time (12-15 million years ago) as the giraffid with the long legs but unelongated neck. Because they existed simultaneously, one did not evolve into the other. This presents an obvious challenge to the Evolutionist's theory. The giraffid showing similar characteristics to the okapi very well could have been another animal or an okapi itself. There is no evidence it was an intermediate species. Evolutionist's lack the evidence to prove that the fossils they have found were in fact ancestors of the giraffe. The fossils discovered could have easily been any cloven-hoofed mammal, or even the fossil of a cow.

Another problem with the Evolutionists' view is the complete lack of intermediate fossils exhibiting the evolving giraffes that must have existed between the short-necked and long-necked giraffes. Even the Evolutionists believe the fossil recorded was too scattered to prove one hypothesis for their own theories. Simmons and Altwegg (2010) conclude: "At present, the fossil record is too patchy to support one hypothesis over the other" (p. 9). The problem with the "sex for necks" hypothesis is that the fossil record should show evidence of a gradually increasing neck length in males over time. The problem with the "competing browser" hypothesis is that the leg length should have increased simultaneously with the neck length, however, the fossil record has presented no evidence of this. There are no fossils displaying these "missing link" giraffes which make up the core foundation of this hypothesis. As Simmons and Altwegg (2010) citing Mitchell and Skinner (2003), and Badlangana et al. (2009) said, one fossil shows short legs and a short neck, and one fossil shows long legs and a long neck. Even the Evolutionists admit the fossil record is too scattered to prove the hypotheses. Creationist Dr. Carl Wieland, a surgeon and former atheist, is the founder of the Creation Science Association in Australia. According to Anderson and Wieland (2007), the fossil record shows no evidence of the short-necked giraffe. Short-necked quadruped (four-legged) fossils

do, in fact, exist; however, these fossils resemble the Okapi which is a mammal with the same features as a giraffe except for a shorter neck. Anderson and Wieland (2007) claim, "When [they] see fossils of Giraffa, there are no short, intermediate and long-necked forms, let alone [ones] showing a progression" (p. 1). Based on the fossil record, the fossils of quadrupeds with short necks easily could have been okapis. More importantly, though, are the fossils not found. Archeologists and scientists have failed to find any fossils up to this point showing the giraffe with an intermediate long neck, and they certainly have not found numerous amounts of fossils which could be placed together to show the slow progression or the timeline of the neck evolution mentioned in these two hypotheses.

The Essential Mechanisms in Place as a Result of Hypertension

Another problem for the Evolutionists is that their theories do not consider the complexity and co-dependence of mechanisms that prevent hypertension as the neck elongates. According to research done by Mittchel and Skinner (2009) on the anatomy of the heart in giraffes, as the baby giraffe matures into an adult, its neck grows longer and its blood pressure increases. Zhang (2006) says, as a result of their long necks, giraffes have extremely high blood pressure and could potentially run into many problems if it were not for certain mechanisms they possess. This creates a problem for the evolutionist. According to Simmons and Altwegg (2010), "we need to determine what maintains giraffe's 2.5m above possible competitors when there are costs" (p. 10). These costs include predation rate, blood pressure and skeletal lengthening (Warren, 1974; Mitchell et al., 2006 as qtd in Simmons and Altwegg, 2010). As one can see, Evolutionists themselves recognize hypertension as detriment to their own hypotheses. As the neck and legs evolve, these mechanisms must simultaneously develop, perfect and complete, in order to keep the mammal alive. Graham Mitchell, is a zoologist at the University of Wyoming and believes in the Evolutionist's theory. In his scholarly article titled "An allometric analysis of the giraffe cardiovascular system," Mitchell (2009) says, "There has been co-evolution of a long neck and high blood pressure in giraffes. How the cardiovascular system has adapted to produce a high blood pressure… [is] largely unknown" (p. 1). An alarming problem in the Evolutionist's theory is admitted by this statement. The giraffe

and its entire species would die if the mechanisms did not evolve in chorus. The Evolutionist agrees that the mechanisms would have had to evolve at the same time as the elongation of the neck, but they do not know how this would occur. The argument of complexity and compatibility is one that the Evolutionist has still to answer.

One of the mechanism the giraffe possesses is a thickening of the skin in order to keep it from excessive bleeding when injured (Mittchel & Skinner, 2010). Lynn Hofland has a B.S. in Environmental Engineering and is an Environmental Test Engineer at NASA Ames research center. He explains in his article, "Giraffes: Animals that Stand Out in a Crowd", how NASA has studied these unique mechanisms in giraffe legs in order to design a gravity suit worn by astronauts. According to Hofland (2013), "The secret lies in an extremely tough skin and inner fascia that prevents blood pooling [into the lower extremities]" (p. 2). The tough skin must be present because the neck of the giraffe is long. The Evolutionists must assume that, by chance, the skin thickened as the neck elongated, but they have no scientific evidence of this. The tough skin around the legs of the giraffe is one of the many mechanisms which would have had to evolve at the same time as its legs and neck in order to keep the species alive and reproducing.

Another mechanism found in the legs is the narrowing of the arterial walls (Ostergaard et al., 2011). Without the narrowing of the arterial lumen (interior of the artery) inside the leg, the blood would puddle in the hoof as a result of the high blood pressure. According to K.H. Ostergaard et al. (2011) who performed numerous dissections of the arterial artery, "…[the] narrowing at knee level is apparent in the newborn giraffe, not yet exposed to gravitational pressure" (p. 696). The dissection of the fetal giraffes proved that the giraffe is born with this trait already in place. The giraffe needs this mechanism as soon as it stands up because it is at that exact moment when the giraffe will experience high blood pressure due to gravity. This is a huge problem for the Evolutionists. If the mechanism gradually evolved with its neck over long periods of time, then the baby giraffes being born during this intermediate time period would not survive due to a non-functional arterial lumen.

Another mechanism the giraffe possesses is the jugular vein valves. According to Graham Mitchell's article, "The structure and function of giraffe jugular vein valves" published in 2009, "…the

main function of the jugular vein valves is to prevent regurgitation of blood from the inferior vena cava and right atrium into the jugular vein and the number of valves [was concluded] to be fixed in utero" (p. 1). Without the presence of these valves, the blood would flow into the jugular vein, which is a vein that carries deoxygenated blood from the brain back to the heart, and cause the blood to re-enter the giraffe's head while it is lowered. This must be prevented. In order to keep the blood from flowing the opposite direction through the jugular vein and to maintain the cardiac output (the amount of blood pumped throughout the giraffe's body), the jugular valves must be fully functional (Mitchell, Van Sittert & Skinner, 2009). These jugular valves would have to evolve simultaneously with the long neck in order for the giraffe to live. According to Mitchell, Van Sitter & Skinner (2009), "… [the valves'] effectiveness in preventing regurgitation will depend on their capacity to withstand the hydrostatic pressure generated by venous return and the column of blood in the jugular veins…and position" (p. 179). In other words the valves must be strong and well-developed in order to withstand the pressure of the blood. If the valves are evolving over time in the neck as it elongates, then the valves which are only partially developed will not be strong enough to hold the blood and the giraffe would die. The effectiveness of the valves also depends on position (near or away from the heart). If the giraffe with the intermediate-length neck only developed the valves closer to the head instead of the valves closer to the heart, then the valves would not do their job, and the giraffe would die. The jugular valves are also seen in the giraffe during gestation. In dissections preformed on fetal giraffes, according to research done by Mitchell, Van Sittert & Skinner (2009), "the number of valves [per unit length] in each segment of the fetuses was the same as in adults, and so the number appears to be fixed in utero" (p. 180). The giraffe is born with this feature because, if absent, the baby giraffe would die at birth. The fact that the baby giraffe is born with this feature shows the importance of the feature for its survival. The giraffes that would have been born with only half-evolved systems would have died immediately after birth. The complexity and coherence of these mechanisms, which must be in place in order for the long-necked giraffe to live, point to a design that was present from the beginning of the giraffe's existence.

The Birthing Process of Giraffes

The last piece of evidence pointing to the Creationists view is the magnificent birthing process of the giraffe. According to Lynn Hofland (2013), "the birth of a new born giraffe seals the case for intelligent design" (p. 3). The birth process of the baby giraffe is indeed a remarkable process which again presents numerous problems for the Evolutionists' hypotheses. As researched by Hofland (2013), because the baby giraffe must face a drop of 1.5 meters from the mother, the exit through the birth canal must be perfectly designed in order for the calf to survive the fall. The female giraffe cannot squat during the birth nor lay down due to the threat of predators, so she must stand while giving birth (Hofland, 2013). The fact that the mother has to stand during the birth means the calf must immerge in a specific manner in order to withstand the fall. If the baby giraffe come out of the birth canal head first, the neck would break because of the weight of its body. In contrast, if the giraffe came out body first, "the neck would surely break as the body weight attempted to jerk the head out of the mother" (Hofland, 2013). According to Hofland (2013), "Such an apparent impasse is solved by the rear hips being smaller than the front shoulders, and the neck is just long enough to allow the head to pass through the birth canal [while] resting on the rear hips" (p. 3). If the baby giraffe did not have the right length neck to pass through the birth canal in this posture then the calf would fall and die. This creates yet another problem for the Evolutionist's theory. If the baby giraffes must have a certain structure in order to come out of the mother's birth canal, how did the giraffes with the intermediate-length neck survive? This question must be answered in order for the Evolutionist's theory to be proven correct. If they theorize that other systems of the mother evolved simultaneously to accommodate the birth of the intermediate species, they create a "domino effect." The female giraffe's birth canal would have to be perfect, so the calf with the longer neck could come out without breaking its neck. This is impossible in an evolutionary scenario. The female giraffe would not be able to change her birth canal before she birthed her calf. The calf's neck would come out first because the canal would be too short. The calf would fall to the ground and instantly break its neck. The birthing process is complex and depends fully on the flawless structure of the calf and mother. Evolution claims that the calf would

change structurally over time, but this idea means the calf would die during birth. The birthing process of a giraffe directly supports the Creationist's theory. The giraffe was created with a long neck and was perfectly designed in structure to come out cleanly and survive the treacherous fall.

Conclusion

The birthing process as well as the fossil record and the essential mechanisms that counteract hypertension are the three specific reasons I believe the Creationists' theory. The giraffe was created originally with a long neck, long legs, and all the interconnect mechanism and processes showing incredible, intelligent design. The giraffe truly is an amazing creature with uniqueness and beauty recognized by all because of its height. The science behind the giraffe's structure is overwhelming, complex, and well-designed. Every mechanism inside the giraffe relies on the others in order to keep the towering beast standing. The sound, systematic science behind the design of this magnificent creature makes me love and appreciate them even more.

Works Cited

Anderson, Daniel, and Carl Wieland. "The giraffe's neck:Icon of evolution or icon of creation." creation.com. N.p., 5 Jan 2007. Web. 5 Nov 2013. <http://creation.com/the-giraffes-neck-icon-of-evolution-or-icon-of-creation>.

Hofland, L. (2013, November 5). Giraffes:animals that stand out in a crowd. Retrieved from http.//www.creationism.org/articles/giraffes.htm

Mitchell, G., & Skinner, J. D. (2009). An allometric analysis of the giraffe cardiovascular system. Comparative Biochemistry & Physiology Part A: Molecular & Integrative Physiology, 154(4), 523-529. Web.

Mitchell, E. (2013, July 13). www.answersingenesis.org. Retrieved from http://www.answersingenesis.org/articles/2013/07/13/bacteria-to-giraffes.

Mitchell, G., Van Sittert, S., & Skinner, J. (2009). The structure and function of giraffe jugular vein valves. South African Journal of Wildlife Research, 39(2), 175-180. Web.

Moore, J. (2008, January 24). www.answersingenesis.org. Retrieved from http://www.answersingenesis.org/articles/2008/01/24/attention-to-word-meaning.

Ostergaard, K., Bertelsen, M., Brondum, E., Aalkjaer, C., Hasenkam, J., Smerup, M., … Baandrup, U. (2011). Pressure profile and morphology of the arteries along the giraffe. Journal Of Comparative Physiology, 181(5), 691-698. Web.

Pitman, D. (2011, October). Giraffes: Walking tall by design. Creation, 33(4), 28-31. Retrieved from http://creation.com/giraffe-neck-design.

Simmons, R. E., & Altwegg, R. (2010). Necks-for-sex or competing browsers? a critique of ideas on the evolution of giraffe. Journal of Zoology, 282(1), 6-12. Retrieved from http.//ehis.ebscohost.com.

Zhang, Q. (2006). Hypertension and counter-hypertension mechanisms in giraffes. Cardiovascular & Hematological Disorders Drug Targets, 6(1), 63-67. Web.