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## From the Mouths of Squinches

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A review of *Evolution: The Story of Life on Earth*, by Jay Hosler, illustrated by Kevin Cannon and Zander Cannon. Hill and Wang, New York, 2011, 160 pp., US\$18.95, ISBN 978-0-809-09476-9

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According to a Gallup poll taken 200 years after the birth of Charles Darwin (Newport, 2009), only 39% of Americans believe in biological evolution. A full quarter of the country does not, and another 36% has no opinion either way. Much ink and sweat have been spilled by evolutionists over the many reasons for this disquieting trend, but foremost among them is the dearth of opportunities for American children to learn anything about the subject. In certain parts of the country, it's possible to go through the entire public school system and enter college without ever having heard the words "natural selection" in a classroom. As for non-academic opportunities to learn about evolution, there seems to be a largely unfilled niche for fun, engaging ways for young people to gain detailed knowledge of this process, which is on one hand elegantly simple, yet also complex enough to be difficult to explain effectively.

Into this deficient market bursts *Evolution: The Story of Life on Earth*, a delightfully illustrated and witty graphic novel for young readers, in which three "squinches" from the watery world of Glargal discuss, from the supremely objective perspective of their home planet, the evolutionary story of life on earth (it is the follow-up to the similarly-styled *Stuff of Life: A Graphic Guide to Genetics and DNA* by Mark Schultz). In this wonderfully accessible and informative book written by Jay Hosler and illustrated by Kevin Cannon and Zander Cannon (no relation), the narrator is the squinch scientist Bloort, who explains the natural history and scientific discoveries of Earth to the Glargalian emperor King Floorsh and his studious son, Prince Floorsh. The king and prince, who are learning this material for the first time, serve as a proxy for the young target audience of the book, summing up long explanations to ensure comprehension as well as clarifying potential misunderstandings and asking questions that any layperson, especially a young one, might have while learning about evolution.

The educational session on Glargal serves as the frame story for the evolutionary tale of life on earth, which is graphically re-enacted for the royal family by means of an interactive holographic museum. For the reader, this means that

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each of the geological periods covered, each of the organisms described, each of the phenomena explained, is lovingly depicted with a distinctive cartoony flair. The wonderfully diverse creatures in the Cambrian explosion almost pop off the page, and Charles Darwin himself appears to give an autobiography and discuss natural and sexual selection. The black and white illustrations are crisp, kooky, and appealing, and the writing is often laugh-out-loud funny, even for adults. One of my favorite parts was the explanation of the size discrepancy between eggs and sperm cells. The egg, fancifully drawn with eyes and a mouth and surrounded by luggage, is mentally going through her packing list, ensuring that she's packed the mitochondria. In the next panel is an army of unladen, charging sperm, wearing mirrored aviator glasses and expressions of stoic grit; the leader is saying "It's a one-way trip, boys. Take only the essentials."

*Evolution* is thoroughly fact-packed, too. Hosler achieves the feat of covering a staggering amount of material, some of it fairly complex, without dumbing the content down while still managing to keep it easy to understand and digestible for young readers. For instance, the extraterrestrials discuss geographical barriers to gene flow, as expected in a book about evolution, but they also explain how ecological and behavioral isolation can facilitate speciation, a level of detail I was not expecting. The book is full of other relatively advanced evolutionarily concepts expressed with ease and simplicity, such as how constraints on natural selection preclude icefish from re-evolving the hemoglobin they lost over evolutionary time, or how the alpha, beta, and gamma males of the marine isopod *Paracerceis sculpta* vary in terms of appearance and sexual strategy all as the result of variance in a single gene. Abiogenesis, early unicellular life, and endosymbiosis, topics which are often given short shrift in children's books on evolution, are given fairly in-depth coverage. Some of the most incredible and edifying content is placed into detailed sidebar pages, written in normal prose rather than word balloons (still quirkily illustrated, though!). It was in one of these sections that I learned that the reason bdelloid rotifers are so evolutionary successful despite reproducing asexually is that they incorporate loose fragments of DNA into their own genotype, allowing for selectable variation without sex. Imagine learning something like that from a children's book!

All in all, *Evolution: The Story of Life on Earth* is an astoundingly sophisticated and enjoyable way to teach evolutionary theory and history to pre-adolescents and teens, and is even a fun read for adults. Although some of the more complex concepts within may be too advanced for some children, its target audience seems to be in the 9-12 age range, and readers of varying proficiency will appreciate it at different levels. If there was one topic which I feel did not get enough emphasis in the book, it was the concept of genetic drift; the notion of random evolution leading to reproductively neutral traits is hinted at but not fully delved into. Such a lapse is inevitable in an introductory book that attempts to cover as much ground as this one does, and is easily forgiven in light of everything that *is* included. Purists might also disagree with the early chordate *Pikaia*'s characterization as a human ancestor (rather than a *possible* candidate for an ancestor). Everything else about the book makes it a perfect way to teach youngsters, especially those who enjoy comic books, about not just the basics of evolution, but also a good deal of the advanced concepts, too.

## REFERENCES

- Newport, F. (2009). On Darwin's birthday, only 4 in 10 believe in evolution.  
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