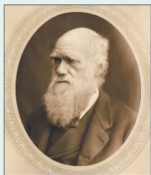




Susan Meadows ■ For The New Mexican



Charles Robert Darwin, photo by Lock and Whitefield; courtesy Palace of the Governors (NMN/DCA), Negative No. 178951

Left, Beagle reborn; modern-day reconstruction of Darwin's ship



Evolutionary road

Douglas W. Schwartz has researched Darwin's early life in England and retraced the voyage of the HMS Beagle to explore Darwin's creative process. The former School for Advanced Research director is president emeritus and a senior scholar of the institution. His research includes extensive archaeological work in the Grand Canyon and in New Mexico.

Pasatiempo: You say Darwin's theory dramatically altered our view of the living world. What was Darwin's genius?

Douglas W. Schwartz: His contribution... was that humans were naturally created, not supernaturally created. His work demonstrated for a wider and wider audience that all living forms developed naturally through an understandable process. This was a sea change from the way the world had conceived of humanity up to that time.

Pasa: What did Darwin do and see on the Galapagos Islands that changed his worldview?

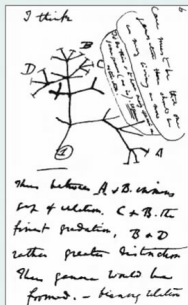
Schwartz: While the Galapagos was important to Darwin, it wasn't important at the time, and it wouldn't have been important if he hadn't seen all the things he saw before that time. He understood that the tortoises on each island... were different species. But this huge diversity of species did not make an impact on him until later in the vast stretches of time he had on the Beagle. He thought back: if those mockingbirds [on the islands] were different from those on the South American mainland... "This would undermine the fixity of species." He had collected 3,000 [plant and animal] specimens around the world... but what he needed was to get back to England and take the specimens... to specialists and say, "Tell me what you see." For the first time [it was] documented that these were indeed different species

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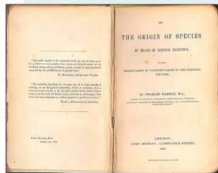


Archaeologist Douglas W. Schwartz following Darwin's trail in the Andes

Left, caricature of Darwin's theory printed in Punch in 1881, following the publication of Darwin's last book, *The Formation of Vegetable Mould through the Action of Worms*.



Darwin's first diagram of an evolutionary tree, from his first notebook (1837) on the "transmutation of species," on view at the American Museum of Natural History in Manhattan



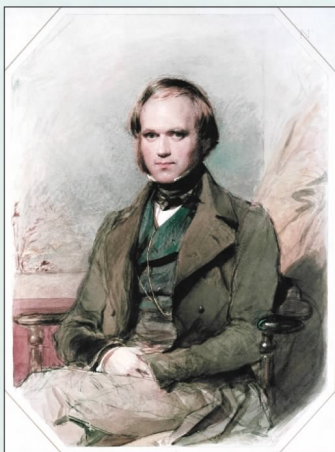
Title page from the first edition of *The Origin of Species*

Charles Darwin knew that his theory of evolution by natural selection would radically change how people viewed the world and our place in it and would infuriate the church and Victorian society. So Darwin worked in secret soon after returning from the HMS Beagle voyage in 1836, minutely examining and testing his "dangerous idea" before publishing *On the Origin of Species* in 1859.

Now, 150 years later, there is scientific consensus that Darwin's theory provides an incontestable explanation of biological phenomena and the necessary framework for understanding the complicated interactions of all living things and their environments. The Vatican and many other religious authorities accept Darwin's ideas, but as the world celebrates the 200th anniversary of Darwin's birth, the vocal minority of biblical literalists who reject evolution as heresy and continue trying to impose their religious beliefs in American science classes proves the validity of Darwin's fears.

The University of New Mexico's Museum of Southwestern Biology in Albuquerque celebrates Darwin Day with an open house featuring free tours of its collections from 1:13 to 3:13 p.m. on Thursday, Feb. 12, the anniversary of the scientist's birthday. For information, call 505-277-1360 or visit msh.unm.edu. (A compilation of worldwide anniversary events can be found at darwin-online.org.uk/2009.html.)

In Santa Fe, the School for Advanced Research honors Darwin with two public lectures. Anthropologist Anne H. Weaver speaks on Tuesday, Feb. 10, and archaeologist Douglas W. Schwartz speaks on Thursday, Feb. 12.



Darwin in his early 30s; watercolor portrait by George Richmond



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on different islands and on different sides of the Andes, and he finally had to accept that "transmutation," as he called it—it was 20 years before he used the word *evolution*—did indeed occur. It was that next two years that he got back from the *Beagle* and was in London where he worked out the theory.

Pasa: As an archaeologist, how did you get interested in Darwin?

Schwartz: I was accumulating an understanding of those elements that contributed to the growth of his creativity. This was a parallel project to my archaeological work and to my work developing and leading this School for Advanced Research. I developed the program of resident scholars in which we first identify people who we think have great potential [and] give them a year of support and put them in an atmosphere, a community of other scholars and artists. So they had time to think and write and to evaluate the work of others and to be evaluated.

Pasa: Sort of like Darwin when he came back.

Schwartz: There was one difference. After Darwin came back, he was a very public scholar; he was giving talks ... telling about his adventures and editing his journal, which became *The Voyage of the Beagle*, a very popular piece of work. These specialists came back with the identification of all of these species, and Darwin realized species are mutable. But that was a very dangerous idea, so he began to lead a secret, double life. He began to not tell anybody what he was doing. He began to work all on his own, not even telling his brother ... certainly not his father ... because it was such a dangerous idea, which is part of the reason it took him so long to publish. I don't think there are many scholars who are forced to deal in that kind of secrecy. That's a theme of his life: the dangerous idea.

There are going to be archaeologists in the audience who certainly know Darwin and Darwin's theory, but very few of them are going to understand how his early life influenced his major breakthrough. I am not talking about evolution. I'm talking about the development of a person from birth to 29 years old. This idle student ... who barely made it through Cambridge ... really didn't attend classes. [He] was out there collecting beetles and reading voraciously. When it came time to graduate, he hadn't studied much, but he crammed and he made it through, and he got this invitation to go on the *Beagle*, and it changed his life.

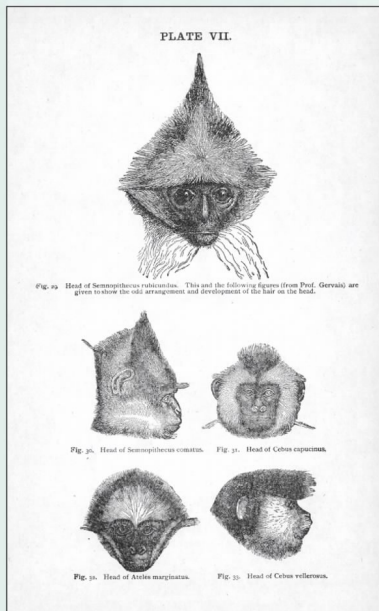
The *Beagle* was such a fantastic opportunity. He'd go someplace, get all these collections and all these observations, and then he'd get on board and he couldn't do anything but read and write and think about what he was doing. I just heard an interview with Bill Gates. A terrible student, he put off studying in his college classes



Marine iguana on the Galapagos



Grey-headed kingfisher on the Cape Verde Islands, off the coast of Africa, where Darwin made his first stop on the *Beagle*; photos by Douglas W. Schwartz



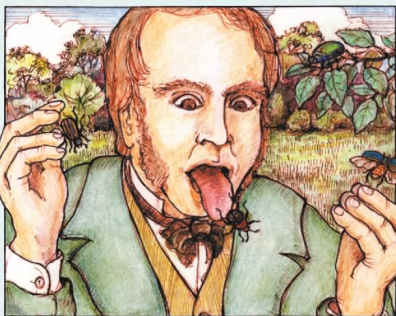
Monkey business: from Darwin's *Descent of Man*, circa 1870

... and then at the end of the semester he would cram, and all the while he was out there in that garage working on a computer. Like Darwin, he had passion; he had focus; he had persistence; he had originality ... and he had time to think and work.

Pasa: And Darwin's writing is so beautiful.

Schwartz: Darwin's writing was so influenced by the Romantic period. As you read in the *Voyage of the Beagle*, where it comes out even more, you see so much for him it's "grandeur." That's a word he uses over and over again. Other people had written about evolution, [though] not the mechanism. [Alfred Russel] Wallace came up with the concept. But it was Darwin's writing that sold the idea, because he was so clear, so precise, and he worked hard at being a good writer, which is where the art and the science overlap.

"Evolving a Genius: The Extraordinary Early Life of Charles Darwin," lecture by Douglas W. Schwartz; 7 p.m. Thursday, Feb. 12; Lensic Performing Arts Center, 211 W. San Francisco St.; 988-1234; no charge; for information, call the School for Advanced Research, 954-7203.



Darwin tasting a beetle and spitting it out; illustration by George Lawrence for *The Voyage of the Beetle* by Anne H. Weaver

Things that make you go hmm

Anne H. Weaver has studied the evolution of the brain in human fossils and is the author of *The Voyage of the Beetle* (illustrated by George Lawrence, published by University of New Mexico Press), an award-winning children's book about Darwin and natural selection.

Pasatiempo: You've said that U.S. children have only a remedial understanding of evolution and rank just above children in Turkey in science literacy among industrialized nations. Why are science literacy and an understanding of evolution important?

Anne H. Weaver: To be able to choose to think scientifically, to have that skill, is vital. It is a different kind of thinking than, say, appreciating art, though that's important too. A scientist thinks in a really important way in always wanting to see the evidence — testing it out instead of just believing what you see. Especially now, when we are inundated with information, you have to be able to really analyze it. It's that skill of checking sources.

Pasa: You ask people today how they know something, and they say, "Because it said so on Wikipedia."

Paleoanthropologist and author Anne H. Weaver

Below, illustrations by George Lawrence from *The Voyage of the Beetle*

Images courtesy Anne H. Weaver and George Lawrence



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Weaver: Yes, and that may be a good place to start, but I wouldn't stake my reputation on it! The process of scientific thinking is so important, especially around evolution. Every aspect of biology depends on our understanding the evolutionary process. That includes how we deal with issues like greenhouse gases for example: if you don't understand the interactions between living organisms ... and changing environments, then how are you going to come up with reasonable, appropriate solutions? Why is HIV/AIDS such a scourge, or malaria, or drug-resistant TB? Why are they drug-resistant? Because they evolve. Our very safety and health depend on it.

When you really grasp evolution, then every time you look at a tree, you look at it with a new sense of wonder. It enriches our lives to feel part of the universe — how we emerged from the rest of life and participate in the grand dance of it. Darwin was a man of wonder.

Pasa: This is the big reaction against Darwin — the idea that we are not a part of nature but in some way above it.

Weaver: Yes, somehow we got convinced of that, and I think our comeuppance is just around the corner, sadly.

Pasa: You say we are easily seduced by the pseudoscientific claims of anti-evolutionists. What is the difference between science and pseudoscience?

Weaver: Evidence, evidence, evidence! As a scientist, you draw your conclusions from the evidence. As a pseudoscientist, you are more likely to cherry-pick the evidence, ignore what doesn't fit, and you create a coherent story. That is part of the seduction. You don't look for the refutation. Scientists have been looking for a refutation for evolution for 150 years. Darwin looked for it for about 25 years [before publishing his theory]. He kicked the tires.

Pasa: Your work on the evolution of the human brain must inform your interest in teaching evolution.

Weaver: As a physical anthropologist it really is about ... Who are we? What makes us special? People tend to say opposable thumbs, but they were around 65 million years ago with the first primates, so they are not unique to us, and a lot of our brain is not unique to us.

Evolutionary theory was the most interesting thing I ever read; it is elegant, and its explanatory powers are pretty well inexhaustible. And if you tie it in with what we are learning about geology and how climate has changed in the past and the continents ... to get a unified picture of our place in the physical and biological world is a huge, thrilling resolution.

Pasa: What is the audience for your talk?

Weaver: It is not geared to children; it is more philosophical and geared to adults. I volunteer at Gonzales Elementary with seventh-graders. ... We've gotten no backlash. I think there is a lot of hype about [what will happen] ... if you say the "e" word, but I think it is much more an organized assault on the school boards and not [from] the general public. Most people have no idea what evolution is, and once they get it, the scary mystique evaporates.

If you understand evolution, you see that, if there is a God, the God is not a micromanager. [Evolution theory] doesn't say anything about whether somebody set it in motion. All it says is the natural laws take care of it. That may frighten people. ... If you don't have an authoritarian deity, how are you going to be moral? But look at Darwin himself; what an utterly moral man. Look at all of the people



PLATE IV.

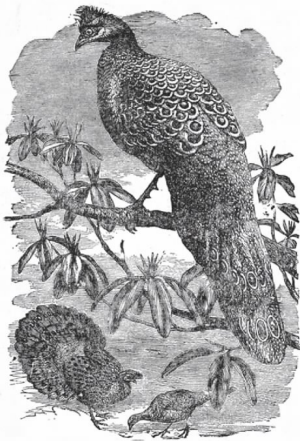


Fig. 20. Polyplectron chinquis, male (T. W. Wood).

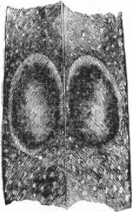


Fig. 21. Part of a tail-covert of Polyplectron chinquis, with the two ocelli of nat. size.



Fig. 22. Part of a tail-covert of Polyplectron malaccense, with the two ocelli, partially confluent, of nat. size.

Pheasant dreams: from Darwin's *Descent of Man*, circa 1870

who quest for knowledge; they are no more immoral than anybody else. [Many evolutionary biologists and anthropologists] are theistic evolutionists. Darwin himself said — I can't quote him exactly — but he said, Isn't it just as wonderful that all this got set in motion according to a set of laws? So I don't feel we have lost anything. At Darwin's time, the whole authoritarian structure of the church justified the social hierarchy, so it [evolution] threatened the social order, but I think that's all in the past.

Pasa: That's why Darwin hesitated to publish.

Weaver: That's part of it. And part of it was that he was just so meticulous. One place where [understanding evolution] is counter-intuitive is around the idea of *what* is evolving. It's *populations* that evolve, not individuals. I think this is one of the hardest concepts, and I am not sure why. I also was thinking about ... how enchanted Darwin would have been in New Mexico — the geological exposures, of course, but also ... New Mexico has more species of dragonflies than anyplace else on earth but Botswana. I wanted the enchantment part of it, and that we can walk out the door and be just as enchanted as Darwin ever was in the Brazilian rain forest.

"The 'E' Word: Teaching Evolution in the Land of Enchantment,"
lecture by Anne H. Weaver; 3 p.m. Tuesday, Feb. 10; School for
Advanced Research, boardroom, 660 Garcia St.; no charge; 954-7203.