



Trick or treat: Two species depicted in the book: above, *Morphio amathonte*; and below, *Rothschildia erycinia*.

“Since we are diurnal, colour-vision mammals, the photographs we chose tend to depict species that are brightly coloured”, they write. “As a result, the particular ledger of species we chose is biased in favour of those that warn potential predators to stay away, and their mimics.”

But the authors point out that so little work has been done on these species that it is hard to know which are genuinely poisonous and which are the mimics.

But the collected photographs represent a stunning array of butterfly and moth morphology and colours and a major potential research resource.

*100 Butterflies and Moths: Portraits from the Tropical Forests of Costa Rica. Jeffrey C. Miller, Daniel H. Janzen and Winifred Hallwachs. The Belknap Press of Harvard University Press, 2007. ISBN-13 978-0-674-02334-X

Nigel Williams

Q & A

Mike O'Donnell

Mike O'Donnell is a professor at The Rockefeller University and a Howard Hughes Medical Institute Investigator. He performed his undergraduate studies at the University of Portland in Oregon. He received his PhD in Biochemistry studying biophysical mechanisms of electron transfer in flavoproteins in 1982 from the University of Michigan in Ann Arbor. During his postdoctoral studies, he learned to work with multiprotein DNA replication systems in the laboratories of Arthur Kornberg and I. Robert Lehman at Stanford. In 1986 he started his own laboratory in the Department of Microbiology at Cornell University Medical College, chaired by Ken Burns. In 1996 he moved to Rockefeller University. His research centers around biochemical mechanisms of multiprotein processes that replicate chromosomes in bacteria and yeast.

Why did you go into science as a career? I didn't really know what I wanted to do until quite late in college. I majored in science, thinking maybe I'd go to medical school. My undergraduate university was small and didn't have a graduate program in science, so I had no idea what science was like as a career. To pay my tuition I worked as a deckhand on a charter fishing boat off the Oregon coast. I fell in love with the temper and beauty of the Pacific, and that relationship deepened my sense of wonder about the workings of the natural world. I started to think of going into marine biology. Then, in my third year, Ralph Yount, a biochemist at Washington State University, came to my campus and was introduced to me by my science professors. He offered me a position for a few months doing bench work in his lab. That experience was an eye opener for me and it really hooked me on science.

Given what you know now, are you happy you went into science? Oh yes. I wouldn't

change it for the world. I miss working on a boat, and I probably would have enjoyed being a marine biologist. But the knowledge that comes with understanding life at the molecular level is a tremendous gift. It provides deep insight into how intimately related we are to every living thing on Earth. Evolution is undeniably obvious at the molecular level compared to the macroscopic world of whole organisms. At least for me, this information acts as a beautiful prism through which to view life and the whole world.

What would you say has been your most important discovery?

I don't think a particular discovery in science can be called your own. Doing science is a real privilege, and except in rare instances, discoveries cannot truly be attributed to one person. Instead, most discoveries stand on the shoulders of the great work that has been performed by so many other scientists. Of course, this is really one of the beautiful things about science in the first place. And to be the person, or laboratory, that takes the work the extra distance that brings it to the level of being called a 'discovery' is more of an honor than anything else.

Do you have a scientific hero, and if so, who and why? I most definitely have a scientific hero: Arthur Kornberg. Arthur Kornberg's scientific accomplishments and absolute dedication to science make him a role model for many people. But for those who have worked in Arthur Kornberg's lab, his influence is of course much deeper. I doubt anybody goes into his lab and comes out the same person. I learned a great deal from him, and his lessons are still growing in me even after all these years.

What is the best advice you have been given? Again, it comes from Arthur Kornberg. One of the many pieces of advice Arthur gave to his postdocs starting their own laboratory was that your own hands are the only ones you can count on for the most important first years of your own lab program.

He also said that having one technician is very useful to help you set the lab up and to facilitate your own work. My technician, Maija Skangalis, helped me start the lab, and together we made the first findings that got the lab on its feet. My students soon became superb scientists in their own right, and I'll always be indebted to them for working so hard. Arthur's advice worked for me, and I pass that same advice onto others that start their own labs.

What do you think of the career path in science, and would you change it at all?

I went into this career, as do many others, with the ambition of becoming a University professor and running my own laboratory. That dream actually came true. But I realize I am very lucky, and that not everyone gets the opportunity to run their own lab. Of course, there are other types of opportunity besides academic science, such as applied science, and administrative and editorial positions, all of which are very important applications of our scientific training. But if one wants to stay in academic science, and does not get the opportunity to run a lab, or even want the extra responsibility that goes along with that, one becomes a long-term research associate, which is basically a professional scientist in someone else's lab. At first glance that may not seem so bad, as one still gets to do academic science. But the salary is relatively low compared to salaries in other professional careers, many of which do not require such a high level of education. That said, none of us went into science for the money. But the value and scientific impact that a long-term research associate can have on a laboratory is really enormous. It would be very nice if there were a funding agency that recognized the value of these 'professional scientists' and specifically helped fund them at a higher level once they have accumulated many years of experience and become a nearly irreplaceable asset to a laboratory.

Do you still work in the lab?

After my first 6 or 7 years, the time commitments of being a

manager, a speaker, a teacher, a writer, a mentor, accountant and fundraiser, took me away from doing my own experiments. But I have missed it, and recently I have gone back to the bench doing experiments as time permits. Boy is it a blast! I missed it more than I knew. Laboratory work is what hooked me on this profession in the first place.

Do you have a favorite paper?

I have a lot of favorite papers. If I were to pick one, it would be Gregor Mendel's work, "*Versuche uber Pflanzen-Hybriden*". Well, I can't read German, but the English translation of "*Experiments in Plant Hybridization*" is available on the web (<http://www.mendelweb.org/>). Mendel's scientific methods and the rationale behind each of his genetic experiments are nothing short of inspirational. And his results are combined so elegantly with his mathematical training. The interpretation of his data is absolutely brilliant. His analysis that traits are particulate and come in pairs, one from each parent, followed logically from the math, but ran completely contrary to the current dogma of his day. His work was presented to a scientific society, and was published and circulated in a limited way. His published work even made it into the hands of some of the leading academic scientists in Europe, but it was too far ahead of its time to be accepted. In fact, rediscovery of his principles of inheritance 40 years later, some time after his death, had the benefit of microscopic visualization of chromosomes and mitosis in cells.

What is your greatest ambition in research?

To continue working as hard as I can doing academic science just as I am right now. Science is the most wonderful pursuit on the planet. It is an awaking. And training people in the art of science is also a privilege. It makes me feel that I am doing my part to advance knowledge, and ultimately to help calm the seas of ignorance that jostle us about.

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