

Fall 2013

BIODIVERSITY

By Andrew Hendry

Impossible Realities: Adaptive Radiations and the Suspension of Disbelief

An excerpt from Andrew Hendry's Research Blog:
<http://ecoevoevoeco.blogspot.ca/>

Adaptive radiations occur when a single ancestral species radiates into multiple descendent species as a result of adaptation to different environments or resources. Adaptive radiations provide perhaps the clearest evidence for the role of adaptation in shaping the diversity of life

Galapagos, Anoles lizards in the Caribbean, figs and fig wasps, Hawaiian silverswords, and so on. The typical assumption of this model of evolution is that a

evolve and speciate to fill them, after which the radiation ceases. However, a number of alternative possibilities exist, such as the evolution of one species creating a brand new niche that favors the evolution of still more species – diversity begets diversity.

These possibilities have been explored using a variety of methods. One method is to try to figure out how many possible niches are out there – and how many of them are filled. That is, do the 13 or so species of

resources to which finches can possibly adapt? Stated another way, is the fact that marine finches and cave

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gotten there yet?

Questions along these lines are often explored by investigators attempting to guesstimate what niches are possible for a given taxonomic group, thus enabling estimates of which niches have and have not been filled by a given adaptive radiation. But how does one establish the range of possibilities? That is, how does one determine whether a hypothetical niche (marine finches) is or is not possible (i.e., accessible to the adaptive radiation)? A common route to this determination is to estimate the range of biomechanically possible morphologies and then determine how much of this range is filled by extant organisms. Unfilled morphospace then means the ed empty niches are still in waiting.

Sometimes I fear that these endeavors are doomed to failure – because it is usually impossible for us to determine what realistic empty niches are out there but have not yet been filled. This opinion first crystallized for me on my first trip to Africa and was

guppies in Trinidad. The key realization for me was

bizarre as to challenge credulity, except of course for the fact that it actually exists. Imagine a bird that lives in caves (some other birds – cave swiftlets also do so), feeds at night (some other birds – nightjars – also do so), has chicks that can be melted down to make oil, and echolocates. Yes, indeed, the echolocate. They use a series of clicks and screeches to help them navigate in pitch darkness both inside and outside of their caves. Bats do it, but birds? Bizarre. Unprecedented. Impossible? I had long heard about oilbirds and had even seen (mostly heard) them fly by while camping at night in remote rivers of the northern range of Trinidad – but never before in 13 years of visiting Trinidad had I seen them in their caves. But this was finally that year, when **Felipe Perez** lead me on a 2.5 hour hike up into the mountains to one of their (few) caves.

From my field notes: We reached the cave well after dark and were coaxed along the last few hundred meters by an ever growing crescendo of loud clicks and screeches. We wormed our way down a tiny creek in a small canyon and into a boulder field that descended into the mouth of the cave. The cave was quite large and extremely noisy and a bit smelly and wet, with water dripping from the cave roof. It was not a horizontal cave like you see in the movies but rather seemed to go about 45 degrees down and into the depths – presumably having been wrought by the creek flow over eons. Along the walls of the cave were ledges that were full of screaming oilbirds.

[Wikipedia notes: In Trinidad it was sometimes called *diablotin* (French for "little devil"), presumably referring to its loud cries, which have been likened to those of tortured men.]

among native and non-native freshwater species which revealed that non-native species are more likely to become pests. Hers was judged to be among the top student presentations (2nd prize). MSc candidate **Jordan Ouellette-Plante** presented experimental work showing the remarkable ability of invasive zebra and quagga mussels in the St. Lawrence River to acclimate rapidly to changing

1850-70 in the Edgefield District. Recent work by the Georgia Archaeological Institute shedding light on the manufacturing process and also on the origin of known vessel styles now provides a more exact attribution for the Redpath jug to the Edgefield Miles Mill pottery (South Carolina), 1867-1872. The Redpath jug also shows strong indications of being made by the same hand as an example in the Metropolitan Museum of Art.

Naukratis Project: Archaeologists at the British Museum are working to re-unite and re-contextualize about 17,000 objects from Naukratis located in the Nile delta of Egypt now distributed among over 60 institutions worldwide, including about 140 artefacts at the Redpath Museum. The study includes material found at Naukratis from the 7th through the 1st century, providing a solid foundation for a new

Egyptian, Greek, and Roman town and a center of cross-cultural contact. The project includes current excavation at Naukratis and also a reassessment of nineteenth century archaeology which will eventually be published as an online catalogue. For more details about the project, see:

http://www.britishmuseum.org/research/research_projects/all_current_projects/naukratis_the_greeks_in_egypt.aspx.

The Casey Wood Collections Project:

Nick Whitfield, a postdoctoral fellow in the Department of Social Studies of Medicine (McGill), has been reviewing the Redpath collection of Sri Lankan *materia medica* assembled by Dr. Casey Wood in the early twentieth century. **Anna Winterbottom**, a postdoctoral fellow in the Indian Ocean World Centre (McGill), working on the early modern history of medicine in the region, has also been examining this material. These researchers have just begun a blog related to Casey Wood and his collection at:

<http://blogs.mcgill.ca/caseywoodcollectionsproject/ab>

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Accessioning, photographing and cataloguing these new Redpath accessions has been greatly assisted by volunteer **Daniel Gagnon**, MA in Egyptology (University of Toronto). **Annie Lussier**, a McGill honors student in Anthropology with a minor in Art History, also provided invaluable assistance organizing archival materials during 2012-13.

In addition to the above, the Redpath received a major donation of approximately 400 artefacts from Afghanistan and neighboring areas, accompanied by notes, slides, books and additional documentary material acquired during the 1960s and 1970s by Canadian Ghislaine Lecours, who was a researcher for a project to develop regionally appropriate educational materials in Afghanistan. The collection was delivered in July by the Canadian Museum of Civilization and the task of unpacking and inventorying this important donation has just begun. Of particular significance is the fact that these objects, notes, and images document Afghanistan and surrounding areas at a time preceding intensive globalization and also before the devastation wrought by decades of social upheaval and warfare. Prior to this addition, the Islamic World was very little represented in the World Cultures holdings.

PHOTO: Parts of the mammal collection stored in

COLLECTIONS ACTIVITY

By Anthony Howell

Collections

The collections are undergoing a state of

updated continuously, and conditions for organizing and maintaining specimens have improved. This past summer, the basement underwent a purge that resulted in a much-needed cleaning of its collections. This included non-specimen material that took up dozens of square feet of space, now used to store collections material.

Specific collections have been outfitted with new, in-house made cabinet trays that better organize specimens as well as consolidate any wasted space in the collections. This has resulted in a much tighter, cleaner, and more efficient collection.

VERTEBRATE PALEONTOLOGY

By Robert Carroll

During 2013, I authored two chapters in the book *Morphology and the ancestry of Turtles*. One chapter is entitled Eugene S. Gaffney: A Professional Biography (pp. 3-8), and the other is called Problems of the ancestry of turtles (pp. 19-36). At the same time, **Hans Larsson** and I have begun preparing a second edition of the standard text book

originally published in 1988, but is now very much out of date.

PUBLIC PROGRAM AND SCIENCE OUTREACH

By Ingrid Birker

Since the last issue of the *Redpath News* in the Fall of 2012, the public program has provided a wide range of talks, activities, workshops, staged readings, flashlight tours and special events to about **61,000** visitors. This number includes the attendance figures for events such as *Freaky Fridays* (attended by 747 people), *Cutting Edge* lectures (attended by 609 people), and the annual climax event on *Montreal Museums Day / La journée des Musées Montréalais* (with 4810 visitors on one single afternoon!).

Last year our team of **Welcome Desk volunteers and student educators** enlightened over **16,000 people on Sunday afternoons alone**. We screened 46 different Science documentary films for about 1000 people. A total of **31 different Family Discovery Workshops were held with over 3000 family members**. Our team of Sunday afternoon volunteers is capably managed by **Janina Szuszkowska** and **Andrew Mestan**. We regret losing Sunday volunteers **Breda Burke** and **Susan Schachter** but welcome **Pat Brabant** and **Caroline Cantin** to the crew.

During the week our Museum educators, namely **Bruno Paul Stenson**, **Jacky Farrell**, **Mireille Marie**, **Pierre diCenzo**, **Sara Pimpaneau** and **Fredéric Belley**, gave stimulating and enlightening guided tours to over **6200 students**. The team of Science Outreach educators **visited 50 different**

venues and over 3000 students in regions as far as Dollard des Ormeaux, Pointe-aux-Trembles, St. Lazare, Pincourt, Beaconsfield, Lasalle, Kirkland, and Lachine. **Thirty-five different sessions of Saturday Science were held at Westmount**, and 7 lunch-hour science workshops were given at **Edinburgh School** in Montreal West (by **Jacky Farrell**). The new *Rock On! Mineral kit* was used by a total of 600 students last year at Pinewood Elementary School in Mascouche, École secondaire Calixa-Lavallée in Montreal Nord, Ecole secondaire du Coteau Westmount Science Camp, Pearson Adult Education

Lasalle. We even had a chance to give science outreach on a rocky beach near Ste. Flavie in Gaspé! This took place in early August *on the Beach* at the Parc de Mitis. The Stones and Fossil tours attracted about 60 family visitors this summer and hundreds of campers.

ILLUSTRATION (left): The Bongo by Mark Taro Holmes of Montreal Urban Sketchers. 2012.

also increasing as we provide more on- and classroom activities. Our public reach has extended to an electronic audience that far surpasses the number of visitors that come to the real museum every day. According to Google analytics,

amphibians and reptiles, volcanoes, minerals and Quebec fauna: www.mcgill.ca/redpath/exhibits/web/.

Facebook, Twitter, and Pinterest pages were created by student interns in the summer of 2012. You can like us and keep track of what we are doing here: <https://www.facebook.com/pages/Redpath-Museum/308943939115940> and here: <https://twitter.com/RedpathMuseum>. In the real