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Reach out to defend evolution

Creationists seize on any perceived gaps in our knowledge of evolutionary processes. But scientists can and should fight back, says **Russell Garwood**.

Last month, this journal published a fossil study that described a new species of large tyrannosauroid dinosaur covered in feathers. A week later, the US state of Tennessee passed a creationist bill that encourages teachers to discuss the “weaknesses” of evolution. The first event provided fodder for a shrewd and calculated creationist machine; the second was its latest victory. As a palaeontologist, I believe the way that scientists and journals present research in my field can help to feed anti-evolution disinformation. Because we tend to stress novelty and play up scientific disagreement, and like to shift paradigms and break moulds, we offer our critics ammunition. As the events in Tennessee show, the fight against evolution comes with significant consequences. And it goes beyond the United States. The national biology curriculum of Pakistan, for example, dictates that students be taught “that Allah ... is the Creator and Sustainer of the universe”.

The novelty of a large dinosaur with feathers was a selling point of the recent paper. However, in spite of a widespread agreement on birds’ dinosaur origins, a limited number of researchers remain sceptical. Within days of the paper appearing, the influential creationist organization Answers in Genesis had exploited this disagreement. It misrepresented the *Nature* paper and disagreement about the equivalence of dinosaur feathers and bird feathers, concluding: “Dinosaurs did not evolve into birds ... no evidence of feather evolution has been found in the fossil record.” It had presented an exciting discovery and a genuine scientific debate (albeit one that has almost run its course) as evidence against evolution, rather than as attempts to refine knowledge in this interesting area.

Another favourite anti-evolution tactic — the god-of-the-gaps — originated in the nineteenth century, and still flies today. This presents perceived gaps in scientific knowledge (genuine or spurious) as evidence in support of theistic world views. The lifeblood of this gappy god is uncertainty — yet good science thrives on unanswered questions. That papers frankly assess and admit shortcomings in current knowledge is vital. But the creationist lobby uses the same literature to try to undermine science.

In my field, uncertainty is everywhere. Much of my work focuses on early land-based animals: the creepy-crawlies that beat our vertebrate ancestors to dry land by a few tens of millions of years. The earliest fossils post-date these first forays into the dry by millions more years. Accordingly, and unsurprisingly, many of them are very well adapted to life on land. Furthermore, although many groups are starkly different from their modern relatives, some look very similar. Take the arachnids called harvestmen. I recently described two fossil examples from rocks 305 million years old that look similar to those we see today.

Their fragility makes harvestmen rare as fossils, and these beautifully preserved new species offered the first opportunity to assess their evolutionary relationships computationally. They turned out to be members of lineages that are still around, and so we reported that harvestmen have an early origin and that they are an example of evolutionary stasis, unlike the majority of other ancient land arthropods, which looked nothing like those we see today.

News coverage of the paper was duly picked up and twisted in the creationist media. A blog on the Lutheran Science website, ignoring the fact that harvestmen are presented as an exception, posited: “And did you note the surprise shown by Dr. Garwood?” It presented stasis as evidence for the non-existence of evolution.

We don’t know why harvestmen are such a good example of morphological stasis; but the fact that they are in no way undermines evolution. Rather, it indicates that further work is needed and encourages such work. Yet knowing that unknowns will be presented as evidence of a designer does make writing up the results a potential minefield.

We should not let creationist pressure alter the way we do science — the day that researchers become reticent about highlighting inconsistencies and uncertainty would be a dark one. But equally, we are not helpless when it comes to countering creationist disinformation based on our results. I believe that science would benefit greatly if we did more outreach when we publish and publicize our research.

Direct debates with creationists are risky.

Organized discussions only support the ‘evolution is in crisis’ lobby. However, a proliferation of online tools means that we can make accurate information freely available to those interested enough to look for it. Arizona State University’s Ask a Biologist web page has fielded more than 25,000 questions from students and teachers since it launched in 1997.

If research is to appear that will attract an obvious creationist interpretation, an accompanying blog post could explain the work and highlight flaws in any anti-evolution attacks. Sites such as the Natural Environment Research Council’s Planet Earth Online and the Palaeontological Association-sponsored palaeontologyonline.com provide researchers with vehicles for one-off posts. Publishers can do more, and could offer online summaries in non-technical language, written by the researchers. The open-access journal *Palaeontologia Electronica* already does this.

Ignoring the creationist threat will not make it go away. As scientists, we owe it to the schoolchildren of Tennessee and elsewhere to find another way to beat it. ■

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