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Crump interprets the stories, rather than simply recounting them. Her background as a research biologist, and her field experience with native peoples, give her a broad perspective on the topic. She weaves a deft blend of summary and commentary, and often returns to emergent themes. Why do particular species appear in leading roles? Why do snakes and toads so often end up both as hero and villain? What was the social function of these stories?

It's tempting to dismiss folklore and fable as entertainment, with no serious message for biologists or conservationists. Fun to read, and a boundless source of anecdotes to enliven your lectures or research seminars. But in a thoughtful introduction to the book, Crump makes a telling point. Most human beings in the world 'know' about reptiles and amphibians through myth, not science. Even in developed countries, the general public is woefully ignorant of reptiles and amphibians (and of evolution, and ecology, and physics, and chemistry, and…). Indeed, many of Crump's fables come from Louisiana or Essex, not Islamabad or Palembang. Of the teeming millions of humans on the planet, few have access to a scientific education. And even of those that do, folk beliefs often trump schoolbooks as a source of trusted information (and I use the word 'trump' advisedly).

Crump argues that we ignore that perspective at our peril. If we want to change views of reptiles and amphibians we need to start out by acknowledging and understanding people's current belief systems. Because views of reptiles and amphibians are shaped by myth and fable, we need to comprehend those stories before we can change those attitudes. It's a compelling argument to drag academics out of the ivory tower into the tribal gathering, to show us a perspective on our beloved study animals that differs from our own, and is vastly more widespread. Crump is no soapbox orator — she writes gently but persuasively. She asks a scientifically-informed readership to open their minds to another way of thinking. And in the process, she gives us some cracking yarns.

School of Life and Environmental Sciences, Heydon-Laurence Building A08, The University of Sydney, NSW 2006, Australia.
E-mail: rick.shine@sydney.edu.au

Q & A

Hugh Dickinson

Hugh Dickinson was born in London, moved to the Midlands, and was swiftly packed off to boarding school. He read biology at his local university, Birmingham (UK), but became quickly distracted by the worlds of motor racing and band promotion — only re-engaging with the subject during a final year project supervised by Jack Heslop-Harrison. Fortunate to get a reasonable degree, he continued with PhD work under Jack's supervision in both Birmingham and Madison (Wisconsin), focusing on plant 'germline' development and genetics. Despite discovering that major RNA processing changes were taking place in plant reproductive cell lineages, the lack of current technology made characterising these 'reprogramming' events increasingly slow and challenging. Thus, while still wrestling with high-resolution TEM autoradiography and some of the first in situ *in plants, he developed a successful second line of research on plant self-incompatibility systems during a post-doc at University College London, and later as a lecturer at Reading University. As time and technology moved on, new methods developed in the 1980–90s rendered the problems encountered in his PhD work tractable, and moving to the Sherardian Chair of Botany in Oxford in the early 1990s, he discontinued work on plant mating systems and returned to this 'unfinished' study of cell specification and fate in reproductive lineages — freshly rebadged as 'epigenetics'.*

Why cell biology? I always thought I was going to be an engineer. As a child I was known (unaffectionately) as 'Hugh the Wrecker' because I took everything apart to see how it worked, and can remember suffering almost physical distress when I couldn't understand how machines like car engines operated. I moved swiftly from a catabolic to an anabolic phase, and spent my late childhood/early teens attempting to assemble — sometimes with success — just about every device imaginable: mechanical, electrical and electronic. In particular, I became progressively more fascinated by systems that operated autonomically. I was thus a sitting target when introduced to cell and molecular biology at university, for here were machines of immense complexity of which we knew very little. Not only did they have their own level of autonomic control, but they also communicated with their neighbours. I was hooked from Day 1. As my family will attest, I have not lost my interest in mechanics, for I still have a garage full of classic (*sensu lato*) cars and motorcycles from the 1960s and 70s patiently waiting for me to rebuild them.

Why reproductive systems? I guess they appeal to me on all fronts and in particular to my fascination with information. Sex cells are not only the bottleneck through which all information and genetics must pass, they are also generated by the very cell linages in which this information is re-assorted during meiosis. I also have a long-time interest in the concept of germlines, and in particular why germline cells become segregated in the very early division of animal embryogenesis (in worms, the first), and why plants have not bothered to do this. I guess this apparent disconnect has led to my current research focus — the nature, generation and maintenance of pluripotency in plant cells.

Despite being literally sexy, there is a severe downside to working on reproductive cells, particularly in plants, and I'm reminded of Pliny the Elder's comment that "*ex Africa semper aliquid novi*…", the gist of which being that all sort of weird things keep coming out of Africa and most should be ignored.

Exactly the same attitude seems to have been adopted through the years by grant and paper reviewers to work on 'non-model cell systems' — or anything other than fibroblasts in animals (I am told), or roots, shoots or leaves in plants. The fact that reproductive cells have far more to tell us seems to have been irrelevant.

Why plants? Principally because David Pickering, a young and charismatic biology teacher at my school, had a BSA motorcycle. He was also the first teacher to focus on the elegance, efficiency and general differentness of plant development, rather than on the 'Victorian pastime' aspects of botany, which had been a feature of our previous teaching. As the research became progressively more challenging during my period as young university lecturer, I began to regret having chosen this path, seeing others making rapid progress with animal systems, and I envied the large and supportive community in which they worked. Nevertheless, as time went on, I once again became riveted by the elegance and complexity of plant systems, particularly of the self-incompatibility systems possessed by dicots. This also became very much the case with the epigenetic work; not only were some of the first examples taken from plants (e.g. the R genes of maize) but also our work on the epigenetics of plant reproductive systems has proved both tractable and rewarding. Finally and perhaps most importantly, it is now very clear that understanding these processes in plants is pivotal in providing the world's population with enough to eat.

Where did you learn the skills that were most use to you in later life? Not on the playing fields (I hated games), but in the common room at boarding school, and on the BMC Mini assembly track at Longbridge. In the school common room, I learnt to survive in an environment where none of the few qualities I possessed (I was the archetypal nerd) were valued. I did this by not reacting to challenges instinctively, taking time to accumulate as much information as possible, and then taking action later when my 'challengers' were not expecting it. This may have turned me into a sneaky individual, but it proved to be excellent training for survival in the scientific community. On the assembly line, I learned the important lesson that you achieve far more and generally have a much better time if you make a real effort to get on with people who think you are a waste of time (and vice versa).

What major mistakes have you made? I thought I would have had a long list here — but on reflection it all comes down to timing. At different periods in my career I have genuinely regretted not going to Oxbridge, having an intractable PhD project, working on reproductive cells, not studying mammalian systems, and not remaining at UCL (where I was offered a job after my post doc). However, looking back, each one of these 'mistakes' has, in the fullness of time, resulted in advantages vastly outweighing my perceived losses. My one true and lasting regret is that the rapid increase in the size of the lab at Reading University (good) meant that I have never taken a sabbatical (very bad), and I feel I am a lesser person for this.

What was it like moving to Oxbridge in mid-career? Difficult. Apart from needing a 6-month course in Byzantine studies to understand how to place an order in Oxford (I am still not sure I know now, but there again I have only been here for 25 years), life is certainly more uncomfortably competitive than in any other university I have been in. I was lucky to be appointed as a statutory professor and have therefore never had to be a college subject tutor, which can be equivalent to academic kneecapping, but life here never fails to remind you that you will only ever be a very small fish in a large pool containing many large and aggressive sea creatures. When I first arrived I recall attending a research board where it turned out that I was the only one there without my own institute. I have learned to live with the shame.

Taken overall, has your work actually contributed anything useful? Very good point; individual discoveries seem very important at the time, but retrospect is a cruel lens through which to view them. I guess we did start the ball rolling in plant germline reprogramming all those years ago, and our work on the cellular basis of self-incompatibility in the brassicas established a foundation for most of the recent studies. More recently, together with Rod Scott's group — now at Bath — we wrote the ground rules of parent-of-origin imprinting in *Arabidopsis*, and my lab's work on maize (led so capably by Jose Gutierrez-Marcos) delineated the difference between plant and animal imprinting systems at a gene-control level, discovered a key family of molecules regulating endosperm development, and showed that there was more than one way to 'imprint' a gene. However you judge these 'achievements', it has been a real pleasure to follow the careers of young researchers involved in these projects as they have left the lab and gone on to greater things. It has also been a privilege to participate in the success of other institutions (albeit from the boardroom) such as the Royal Botanic Gardens, Kew, and the John Innes Centre by working as a member of their governing structures.

What's right and wrong with science today? There's a lot more right than people readily admit. There are amazing tools to work with, both subject-specific and generic, and the scientific community is larger and more connected than ever before. Despite the bleating of government and some of the research councils, there is a massive amount of interdisciplinary research currently under way, and great efforts are being made to make research relevant to society. Finally, activity in the exciting 'crossover' areas between biology, chemistry and physics has resulted in a new generation of challenges. At a risk of being lynched by many of my colleagues, I would also claim that institutional assessments such as the UK's Research Excellence Framework, particularly as it was carried out in its last iteration, is having a lasting and positive effect on UK research.

I'm sure that what's wrong with science today is almost exclusively related to outside influences — particularly government. First and foremost, despite much heat and light emanating from the research councils and the universities, the career structure for UK scientists remains a disaster, with the post-doc cliff looming before the lemmings that are long-term post-doctoral researchers. On occasion, brave attempts have been made to increase the number of fellowships available, but at the first sight of hard times, they are the first to go — closely followed by universities' willingness to give fellows jobs once their contracts are over. A second problem is the insistence of governments, seemingly world-wide, that business must be involved in all aspects of research. Certainly it is good to know that research is reflecting the priorities of industry, but it is a mystery to all concerned (including many in industry) why so many recent research initiatives require companies to be so centrally involved; some even require industry to lead applications.

My other concern is the messy battleground of scientific publication, with the new generation of open-access journals, goaded on by major funders, locked in a seemingly eternal struggle against the old guard of subscription journals. Hopefully, some sort of equilibrium will eventually be achieved, and it's encouraging that most universities/institutes are now finding ways around the publication charge problem. Of course, beneath all this lurks the Voldemort Number (a.k.a. Impact Factor), the effect of which is always denied, but which continues to drive everyone's publishing agenda. The system seems to be very much stacked against those researchers not in large well-funded labs or from developing countries, and that's why I have become involved with a publishing charity whose aim is to tackle some of these problems.

What are you doing now? I am now retired and lucky to be a guest in the Department, where I help with teaching and providing some technical backup. I also have a corner of a lab where I am working down a list of all those 'Friday afternoon' experiments that never got done. However, having been back and struggling at the bench for a year or two, I feel I now should write to all my past postdocs apologising for my unreasonable expectations...

Department of Plant Sciences, Oxford University, South Parks Road, Oxford, UK.
E-mail: hugh.dickinson@plants.ox.ac.uk

Quick guide

Bogong moths

Stanley Heinze* and Eric Warrant

What is a Bogong moth? The Australian word 'bogan' refers to a mouthy, rather obnoxious Australian version of the American redneck. Except for their country of origin, the bogan and the Bogong have nothing much in common. The moth's common name is derived from the local Aboriginal word for 'mountain': the Bogong moth *Agrotis infusa* is therefore a mountain moth. Even though Australia is not most famous for its abundance of alpine peaks, there is a handful of snow-topped mountains in the south-east corner of the continent, close to the capital Canberra, that are optimistically referred to as the Australian Alps. Once you go there and catch a Bogong moth, you will find yourself holding a rather plain, medium sized, grey-brown moth (Figure 1). What then sets them apart from other medium-sized, grey-brown moths?

Why are they interesting? If you ever have the chance of hiking the Australian Alps in summer, you will find an ancient and beautiful mountain range. The grassy, treeless peaks, polished aeons ago by glaciers, are littered with countless granite boulders of all shapes and sizes. If you are not claustrophobic and dare to climb into one of the crevices formed by these rocky ensembles, your breath will be taken away, first by the dense clouds of ultra-fine, silvery dust drawn to your face by swift air currents channelled through the rock chimneys, and then by the sight of the source of the dust: hundreds of thousands of Bogong moths, neatly tiling the cave walls. In fact, there are about 17,000 of them per square meter, but you will only find them by chance if you are very lucky. This is because we only know of a handful of such caves, and the moths are present there only for four months during the height of the Australian summer.

Before European settlement, the Aboriginal peoples inhabiting both sides of the range were well aware of the presence of these insects, and during summers several tribes converged on the high alpine plains to feast on Bogong moths, taking the opportunity to renew old friendships, attend to tribal business and arrange marriages. Other than having contributed to ancient human networking, the moths are also a major component of the alpine food web, being an extremely important food source for several alpine vertebrates, including the critically endangered mountain pygmy possum *Burramys parvus*.

So how do the Bogongs get to these caves? And why? And where are they during the remaining part of the year? This is what makes these insects so remarkable and interesting: it turns out that the Bogong moth is a long-distance migrant. Each spring billions of them leave the heat of their breeding grounds in southern Queensland and north-western New South Wales to fly more than 1000 km until they reach the Australian Alps, where they aggregate in isolated, cool mountain caves. Once there, they switch their bodies into a dormant state not unlike hibernation (in summer this dormancy is called aestivation). A few months later, with the onset of autumn, the moths return to their distant birthplaces, where they mate, lay eggs, and die. The next generation will then repeat the migratory endeavour.

All this makes the Bogong moth, in many respects, similar to the iconic North American Monarch butterfly *Danaus plexippus*, except that it is a night-active species and therefore cannot use the sun for orientation. And unlike the Monarch butterfly, where the full forward and reverse migrations are performed by several generations, individual Bogong moths perform both migrations. If you think of the Monarch butterfly as the King of insect migration, the Bogong moth is certainly insect migration's Dark Lord.

How do they find their way? The short answer is that we don't know. But given that the Bogong moth migrates during the night, it is clear what information it cannot use: the Sun and the Sun's polarization pattern. These are major compass cues exploited by day-active migrants, such as the Monarch butterfly, as well as by desert locusts and many birds. But at night, only nocturnal visual cues and the Earth's magnetic field are available. It is well known that both types of information are used by insects for orientation. Dung beetles, for example, use the Moon and its surrounding